# Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia
## -A Prospective Observational Cohort Study

Thesis submitted to the faculty of

**All India Institute of Medical Sciences, Bhopal**

For the award of the degree of MD in the subject of

**Anaesthesiology and Critical Care Medicine**

By

**Dr. Rinu Raju**

**(2100353M02P41003)**

Under the guidance of

**Dr. Pooja Singh**
Additional Professor

Department of Anaesthesiology and Critical Care, AIIMS, Bhopal

**October 2023**

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

## UNDERTAKING

I, **Dr. Rinu Raju**, MD scholar registered in the batch July 2021, vide registration no. **2100353M02P41003** , hereby declare that the data submitted for my MD thesis belongs to me and is original. I also certify that the work was done by me to carry out this study.

The Institute shall not be responsible for any dispute or any conflict of interest that may arise out of this thesis at any stage.

**Dr. Rinu Raju**

Academic Junior Resident
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Guide:**

**Dr. Pooja Singh**

Additional Professor
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

Dr. POOJA SINGH
MD, PDCC (Anaesthesiology)
Reg.No.MP-7048, MCI-10-8550
Additional Professor
Deptt. of Anaesthesiology
AIIMS, Bhopal-462020

**Place:** Bhopal
**Date:** 14/10/23

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

## CERTIFICATE

This is to certify that the thesis entitled "**Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia: A Prospective Observational Cohort Study**" is a bonafide and genuine research carried out by **Dr. Rinu Raju** under the guidance and direct supervision for the award of MD degree.

**Guide:**

Dr. POOJA SINGH
MD, PDCC (Anaesthesiology)
Reg.No.MP-7048, MCI-10-8550
Additional Professor
Deptt. of Anaesthesiology
AIIMS, Bhopal-462020

**Dr. Pooja Singh**
Additional Professor
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Co-Guide:**

Dr Pranita Mandal
MBBS, MD Anaesthesia (DMC 62757)
Fellow Paediatric Anaesthesia
Assistant Professor, Department of Anaesthesiology
All India Institute of Medical Sciences (AIIMS) Bhopal, MP-462020

**Dr. Pranita Mandal**
Assistant Professor
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Place:** Bhopal

**Date:** 12/10/2023

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

## DECLARATION

I hereby declare that the thesis entitled **"Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia: A Prospective Observational Cohort Study"** is a bonafide and original work carried out by me under the guidance of Dr. Pooja Singh, Additional Professor, Department of Anaesthesiology and Critical Care. The thesis or any part thereof has not formed the basis for the award of any degree/fellowship or similar title to any candidate of any university to the best of my knowledge.

Rinu Raju

**Dr. Rinu Raju**

Academic Junior Resident
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Place:** Bhopal

**Date:** 14/10/2023

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

## CERTIFICATE

This is to certify that the thesis entitled "**Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia: A Prospective Observational Cohort Study**" is a bonafide and genuine research carried out by **Dr. Rinu Raju** under the guidance and direct supervision of **Dr. Pooja Singh**, Additional Professor, in the Department of Anaesthesiology and Critical Care.

Dr. VAISHALI WAINDESKAR
Reg.No.69361 M.D., MBBS
PROFESSOR & HEAD
Department of Anaesthesiology
All India Institute of Medical Sciences
Saket Nagar,Bhopal-462020

**Dr. Vaishali Waindeskar**
Professor and Head
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Place:** Bhopal

**Date:** 14/10/2023

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

## CERTIFICATE

This is to certify that the thesis entitled "**Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia: A Prospective Observational Cohort Study**" is a bonafide and genuine research carried out by **Dr. Rinu Raju** under the guidance and direct supervision of **Dr. Pooja Singh** (Additional Professor, Dept. of Anaesthesiology and Critical Care) and co-guide **Dr. Pranita Mandal** (Assistant Professor, Dept. of Anaesthesiology and Critical Care) in AIIMS Bhopal.

**Dr. Rajesh Malik**
Dean (Academics)
AIIMS, Bhopal

**Place:** Bhopal

**Date:** 17.10.2023

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

## COPYRIGHT DECLARATION

We hereby declare that All India Institute of Medical Sciences, Bhopal, shall have all the rights to preserve, use and disseminate this thesis in print or electronic format for academic/research purpose.

**Dr. Rinu Raju**

Academic Junior Resident
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Guide:**

Dr. POOJA SINGH
MD, PDCC (Anaesthesiology)
Reg.No.MP-7048, MCI-10-8550
Additional Professor
Deptt. of Anaesthesiology
AIIMS, Bhopal-462020

**Dr. Pooja Singh**
Additional Professor
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Co-Guide:**

Dr Pranita Mandal
MBBS, MD Anaesthesia (DMC 62757)
Fellow Paediatric Anaesthesia
Assistant Professor, Department of Anaesthesiology
All India Institute of Medical Sciences (AIIMS) Bhopal, MP-462020

**Dr. Pranita Mandal**
Assistant Professor
Department of Anaesthesiology and Critical Care
AIIMS, Bhopal

**Place:** Bhopal

**Date:** 12/10/2023

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**
Saket Nagar, Bhopal – 462020 (M.P)
**Institutional Human Ethics Committee- PostGraduate Research (IHEC-PGR)**
www.aiimsbhopal.edu.in Email: ihecpgr@aiimsbhopal.edu.in

**Ref Number:** IHEC-PGR/2021/PG/Jul/04 **Date:** 23rd February 2022

## Letter of Permission

| **Student Investigator:** | **Guide:** |
|---|---|
| Dr. Rinu Raju | Dr. Pooja Singh |
| Anaesthesiology | Anaesthesiology |

AIIMS, Bhopal Institutional Human Ethics Committee- Post Graduate Research (IHEC-PGR) in its 5th meeting held on 10th February2022 discussed your proposal titled **"Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia: A Prospective Observational Cohort Study"** and evaluated it for suitability for your dissertation as required for fulfilment of MD/MS program.

**Following members attended the meeting:**

1. Prof. D. K. Pal, Professor & HoD Community Medicine, GMC, Bhopal…Chairperson
2. Prof. Rajnish Joshi, Professor of General Medicine, AIIMS, Bhopal……..Member
3. Prof. Amit Agrawal, Professor of Neurosurgery, AIIMS, Bhopal……..Member
4. Dr. Girish Bhat, Assoc. Professor of Paediatrics, AIIMS, Bhopal……..Member
5. Dr. Ujjawal Khurana, Asst. Professor of Pathology, AIIMS, Bhopal……..Member
6. Dr. Ankur Joshi, Asst. Professor of CFM, AIIMS, Bhopal……..Member
7. Dr. Shubham Atal, Asst. Professor of Pharmacology, AIIMS, Bhopal……..Member
8. Mr. Yogesh Kumar, Executive Director, Samarthan……Member
9. Dr. Shashank Purwar, Addl Professor of Microbiology, AIIMS, Bhopal…..Member Secretary

**The decision of the committee is as follows:**

The AIIMS, Bhopal IHEC-PGR approves your research protocol. All research related activities must begin only after the date of this approval. The validity of this approval is till two years from the date of issuance. Please submit a closure report / renewal request before expiration of the validity for this approval.

Shashank Purwar

**Dr. Shashank Purwar**
**Member Secretary, AIIMS Bhopal IHEC-PGR**
**Additional Professor of Microbiology**
**AIIMS, Bhopal**
**Contact Number: 7773010099**

DrillBit

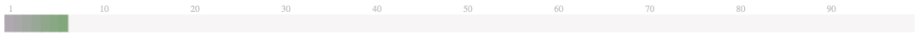
The Report is Generated by DrillBit Plagiarism Detection Software

### *Submission Information*

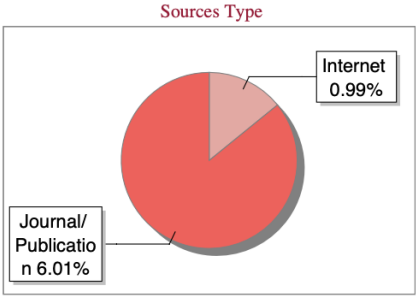
| | |
|---|---|
| Author Name | Rinu Raju |
| Title | Thesis |
| Paper/Submission ID | 1022378 |
| Submission Date | 2023-10-12 21:36:53 |
| Total Pages | 54 |
| Document type | Thesis |

### *Result Information*

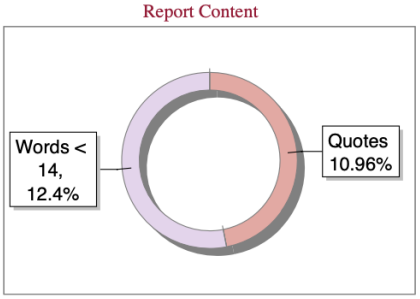
Similarity **7 %**




Sources Type




Report Content




### *Exclude Information*

| | |
|---|---|
| Quotes | Excluded |
| References/Bibliography | Excluded |
| Sources: Less than 14 Words Similarity | Excluded |
| Excluded Source | **7 %** |
| Excluded Phrases | Excluded |

A Unique QR Code use to View/Download/Share Pdf File

# ACKNOWLEDGEMENT

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout my thesis work to complete the thesis successfully.

I would like to express my deep and sincere gratitude to our Honorable Director, the Dean of Academics, all the members of the Thesis Review Committee, and the Institutional Human Ethics Committee (IHEC) for granting me permission to work on this thesis, titled "Association of Frailty with Postoperative Outcomes in Patients undergoing Elective Non-malignant Abdominal Surgeries under General or Neuraxial Anesthesia ; A Prospective Observational Cohort Study".

My heartfelt thanks go to my guide, Dr.Pooja Singh, (Additional Professor, Dept.of Anesthesiology and Critical Care, AIIMS Bhopal) for providing invaluable guidance throughout this research. Her expertise, tireless dedication, and insightful guidance have been invaluable. It was a great privilege and honor to work and study under her guidance.

I would also like to extends my thanks to my co-guide Dr. Pranita Mandal (Assistant Professor, Dept.of Anesthesiology and Critical Care, AIIMS Bhopal) for all the love and support throughout this journey.

I take great pleasure to thank Dr. Vaishali Waindeskar, (HOD, Dept.of Anesthesiology and Critical Care, AIIMS Bhopal) who has shown us the right path in building this academic career. Her love and affection towards us, made this place feel like a second home.

I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future. I am very much thankful to my siblings Rini,

Rani for their love, understanding, prayers and continuing support to complete this research work.

My Special thanks goes to my friend Dr Asha . s h e h a s stood by me and has always pushed me to thrive while doing the research work. You've made the long nights and hard work seem less daunting, and for that, I am truly thankful.

I take immense pleasure to thank all consultants who have been so supportive in all aspects, Including my batchmates Dr Vandana, Dr Bhavana , our shared experiences, collaborative learning, and mutual support have made this academic journey more meaningful. I would like to say thanks to my juniors and seniors for their constant encouragement and immense help.

I take this opportunity to thank all of you from the deepest corners of my heart and would forever be grateful to you for having accepted my sincere gratitude.

# TABLE OF CONTENTS


| Serial No | CONTENT | Page No |
|---|---|---|
| 1. | APPENDIX I: List of Tables | 2 |
| 2. | APPENDIX II: List of Figures | 3 |
| 3. | APPENDIX III: List of Abbreviations | 5 |
| 4. | INTRODUCTION | 7-9 |
| 5. | REVIEW OF LITERATURE | 10-17 |
| 6. | AIM AND OBJECTIVES | 18 |
| 7. | MATERIAL AND METHODS | 19-26 |
| 8. | RESULTS | 27-50 |
| 9. | DISCUSSION | 51-56 |
| 10. | CONCLUSION | 57 |
| 11. | LIMITATIONS | 58 |
| 12. | SUMMARY | 59-60 |
| 13. | REFERENCES | 61-67 |
| 14. | ANNEXURES<br>I. PROFORMA SHEET<br>II. PARTICIPANT INFORMATION SHEET<br>III. प्रतिभागी सूचना पत्<br>IV. INFORMED CONSENT FORM<br>V. सूचित सहमति -पत्र<br>VI. MASTER CHART | 68-83 |

# APPENDIX I: LIST OF TABLES


| Table No | Title of Table | Page No. |
|---|---|---|
| 1. | Age wise distribution of baseline characteristics | 27 |
| 2. | Values derived from ROC-AUC curve | 33 |
| 3. | Association of mFI scores with postoperative complications as per Clavien-Dindo classification. | 34 |
| 4. | Correlation of MFI with CD grade complications in different age group | 38 |
| 5. | Postoperative complications in different type of anesthesia at different MFI | 39 |
| 6. | Incidence of postoperative complications in general and neuraxial anesthesia in patients with low and high frailty index. | 42 |
| 7. | Association of mFI with 30 days readmission | 46 |
| 8. | Association of MFI with length of stay | 48 |

# APPENDIX II: LIST OF FIGURES


| Figure No. | Title of Figure | Page No. |
|---|---|---|
| 1. | Gender distribution in different age groups. | 29 |
| 2. | Distribution of minor, intermediate and major surgery in different age groups. | 30 |
| 3. | Distribution of anesthetic technique in different age groups. | 30 |
| 4. | Distribution of minor and major complications in different age groups. | 31 |
| 5. | ROC curve analysis using MFI for prediction of major complications | 32 |
| 6. | Sensitivity, specificity and predictive value of mFI for major postoperative complications. | 33 |
| 7. | Incidence of postoperative complications as per Clavien-Dindo classification in patients with different mFI | 37 |
| 8. | Percentage of postoperative complications in patients with different mFI undergoing different type of anesthesia. | 41 |
| 9. | Incidence of postoperative complications of different grades in patients with low (≤0.27) and high mFI (≥0.27) undegoing neuraxial and general anesthesia | 45 |

| | | |
|---|---|---|
| 10. | Incidence of 30-day re-admission in patients of different mFI | 47 |
| 11. | Association of mFI with length of hospital stay | |

# APPENDIX III: LIST OF ABBREVIATIONS

| ABBREVIATION | EXPANDED FORM |
|---|---|
| (ACS NSQIP) | American College of Surgeons National Surgical Quality Improvement Program |
| ASA | American Society of Anesthesiologist |
| (CSHA) | Canadian Study of Health and Aging |
| CSHA-FI | Canadian Study of Health and Aging Frailty Index |
| CD | Clavien Dindo |
| CI | Confidence interval |
| CNS | Central nervous system |
| CPT | Current Procedural Terminology |
| CVS | Cardiovascular system |
| ICU | Intensive Care Unit |
| LEB | Lower extremity bypass |
| MFI | Modified Frailty Index |
| NSQIP | National Surgical Quality Improvement Program |
| OR | Odds ratio |
| ROC curve | Receiver operating characteristic curve |
| r value | Pearson's correlation coefficient |

| | |
|---|---|
| SSI | Surgical Site Infection |
| TPN | Total Parenteral Nutrition |

# INTRODUCTION

Surgeons and anesthesiologists have sought to understand why some patients do well in the perioperative period while others have poor outcomes. This is particularly relevant in the elderly and polymorbid population. Although age is an important factor to consider in preoperative planning, multiple studies showed that age alone is not the only predictor of poor outcome. Frailty is an accumulation of deficits or a loss of physiologic reserves that prevents patients from recovering from stress.[1,2]

Patients may tend to overestimate their capacity to tolerate major surgical stresses, which could potentially lead to excessive expectations of their success and recovery. Further, surgeons frequently depend entirely on a patient's age and not enough on an objective measure of physiologic reserve.[3]

Frailty has been defined as a clinical syndrome that involves the progressive loss of physical and mental function with or without the coexistence of disease.[1] With decreased physiologic reserves, frail individuals have a decreased ability to maintain homeostasis and an increased vulnerability to acute stressors, including surgery.[2]

Several Studies have shown that frailty is an independent predictor of postoperative complications, hospital length of stay, discharge to a skilled- or assisted-living facility, and mortality.[4]

Despite the growing attention paid to frailty as a risk factor for perioperative morbidity and mortality, there are few well-designed studies evaluating various current anaesthetic techniques in the frail population. So far, it's uncertain if the anesthetic technique significantly impacts outcomes in frail surgical patients. The surgical requirements and patient comorbidities will both influence the anaesthetic technique selected for the management of a patient. It should therefore be encouraged to carefully analyze the issues associated with frailty and the development of a frailty-specific anesthetic plan to minimize these changes should be advocated. [5,6]

The Canadian Study of Health and Aging (CSHA) on the epidemiology of dementia developed the 70-item scale - CSHA-FI based on many deficits that may be associated with frailty. The simplified version consisting of eleven health deficits was created modified frailty index (mFI-11) because of the difficulties in measurement of each of the multiple factors.[7]

The mFI was created by Tsiouris et al. who conducted a comparison between the original CSHA- FI with variables measured in the NSQIP dataset. Eleven preoperative clinical NSQIP variables were identified that matched some of the original 71 CSHA-FI variables. All of the variables were dichotomous (i.e., present or absent). To calculate the mFI, the presence of each variable equals 1 point, and the total points for each patient were divided by 11 to obtain the patient's mFI score (range 0–1.0). An increase in the mFI score implies increased frailty.[8]

mFI can be quickly calculated from information gathered from a standard history and physical examination and has been found to be predictive of postoperative outcomes, including after major abdominal surgery.[9,10,11] Specifically, Louwers et al reported that increased mFI was associated with a significant increase in Clavien Dindo Class 4 complications and mortality in patients undergoing hepatectomy,[10] while Obeid et al found that increased mFI scores were associated with Clavien Dindo Class 4 and 5 complications in patients undergoing colectomy.[11]

Chappidi et al and Uppal et al recently reported that increased mFI scores were an independent predictor of Clavien Dindo Class 4 or 5 complications in cancer patients undergoing radical cystectomy and gynaecological surgery, respectively.[12,13] Thus, with the aid of this prevalidated risk assessment tool, we sought to determine whether the mFI was predictive of postoperative morbidity and mortality in abdominal surgeries.

The primary objective of our study was to determine the association of frailty as defined by the modified frailty index score, with postoperative complications in patients undergoing non-malignant abdominal surgeries under general or neuraxial anesthesia. The secondary objective was to determine the incidence of readmission and mortality in patients with different grades of frailty, within 30 days of surgery conducted under general or neuraxial anesthesia.

# REVIEW OF LITERATURE-

Elderly patients make up a growing proportion of the surgical population and may have significant health issues. Both the aging process and disease processes can have an impact on frailty. Frailty does not, however, apply to everyone who is elderly or ill. On the other hand, not everyone who is fragile is old or has a medical issue. However, frailty is a syndrome that is typically seen in persons over 65 years of age.

The American Society of Anaesthesiologists (ASA) score, is one of the most often recorded physical classification systems, but it is a subjective assessment. It is not uncommon for any two anaesthetists to differ in their classification of a patient. During the routine preoperative assessment, determining a patient's frailty may assist in stratifying perioperative risks for that patient.

The Lee cardiac index is another example, which is used to assess the risk of cardiac complications during the perioperative period. Only the cardiovascular system is evaluated by this index. In contrast to typical risk assessment techniques, frailty assessment offers the potential to evaluate a patient's physiological reserves.

Several factors make it crucial to stratify a patient's perioperative risk. Through frailty assessment, people who have a limited capacity to cope with the physiological stressors they encounter in the perioperative period may be found. Frailty assessment enables clinicians to accurately inform patients of their perioperative risk, allowing more informed decisions about healthcare options. It also allows treatment decisions to be tailored specifically for that patient and may include a less invasive procedure or medical rather than surgical management of a condition.

Prior to surgery, frailty assessment may enable a patient's condition to be optimized. It also aids doctors in anticipating and preparing for potential issues. The overall goal of perioperative risk stratification is to reduce the incidence and severity of perioperative complications and their consequences (such as rising dependency, reduced quality of life, mortality, and healthcare costs).

In 2012, **Athanasios Tsiouris et al** did study to assess morbidity and mortality after lobectomy using modified frailty index. National Surgical Quality Improvement Program (NSQIP) Participant use files (2005-2010) were reviewed from National Surgical Quality Improvement Program (NSQIP). Patients undergoing lobectomy were identified. Morbidity and mortality of the identified 1940 patients who underwent open lobectomy uniformly increased as the mFI increased. This study shows that the mFI may be used to identify patients who are more likely to have morbidity and mortality after lobectomy. Preoperative selection is important in minimizing morbidity and mortality in the aging population and improving risk stratification for informed decision-making. [14]

In 2015, a study conducted by **Rushna Ali** et al concluded that a higher mFI was linked to an increased risk of postoperative morbidity and mortality, giving an additional approach to enhance perioperative risk stratification".[6] For patients undergoing spine surgeries, based on Current Procedural Terminology (CPT) codes, the National Surgical Quality Improvement Program (NSQIP) data set from 2006 to 2010 was retrieved. 16 preoperative clinical NSQIP variables were matched to eleven CSHA-FI variables (changes in daily activities, gastrointestinal problems, respiratory problems, clouding or delirium, hypertension, coronary artery and peripheral vascular disease, congestive heart failure, and so on). A total of 18,294 patients were selected. The outcomes evaluated were adverse events that occurred within 30

days. Any infection, wound-related problems, Clavien Dindo - IV complications (life-threatening, requiring ICU admission), and mortality were then collectively documented. With an mFI of ≥ 0.27 had rates of 4.1% and 7.1% for surgical site infections and Clavien Dindo IV complications, respectively ($p < 0.001$ for both).[15]

In 2015, **Louwers et al**, using the National Surgical Quality Improvement Project database, examined hepatectomy patients from 2005 to 2011 and correlated frailty scores with outcomes of major morbidity, mortality, and extended hospital stay, using a previously validated modified frailty index score. It was found to be the best predictor of both mortality and Clavien Dindo 4 complications (OR = 26.4, 95% CI = 7.7 to 88.2) by multivariate regression. There was a statistically significant increase in Clavien Dindo 4 complications, mortality, and extended length of stay ($P < .001$ for all), as the frailty score increased. [10]

**A** study done by **Shitanshu Uppal et al** (2015) to evaluate the predictive efficacy of the frailty index for 30-day Clavien Dindo class IV (requiring critical care support) and class V (30-day mortality) complications following cancer surgery in gynaecological patients, included in the National Surgical Quality Improvement Program (NSQIP) 2008-2011. Clavien Dindo IV/V complications occurred at rates of 2%, 2.7%, 4.4%, 7.4%, and 24.4%, respectively, for mFI scores of 0, 1, 2, 3 and ≥4, respectively ($p<0.001$). They concluded that Modified frailty index (mFI) is a good predictor of the need for critical care support and 30-day mortality after surgery [13]

A study conducted by **Mohammad H. Eslami,** et al, in 2016, to see the association between frailty index and outcomes after elective lower extremity bypass (LEB) for lower extremity ischemia showed that higher mFI is independently associated with higher mortality and morbidity. Retrospective analysis of prospectively collected data from the American College

of Surgeons National Surgical Quality Improvement Program database (2005- 2012) was used to identify patients who underwent elective LEB using diagnostic and procedure Current Procedural Terminology codes. Modified frailty index (mFI) scores from the Canadian Study of Health and Aging were divided into three groups: low (0-0.39), medium (0.4-0.49), and high mFI (0.50). Association mFI with 30-day postoperative mortality (POD), myocardial infarction (MI), cardiopulmonary events (CPEs), deep tissue surgical site infection (SSI), and graft failure (GF) were assessed. Of 12,677 patients (mean age, 67.7 6 11.1 years) identified who underwent elective LEB, POD occurred in 265 (2.1% overall). Postoperative SSI, MI, CPEs, and GF occurred in 2.5%, 1.6%, 3.1%, and 4.3%, respectively. The mean mFI of the total sample was 0.3± 0.1. When compared to the low frailty group, the adjusted odds ratio for the development of any morbidity in the group with the highest mFI was 1.36 (95% confidence interval, 1.08-1.72; P=.010). A statistically significant trend of increasing mortality with increasing mFI scores was noted (P < .001). A similar trend of increased MI, CPEs, and any morbidity (P < .001) was found among the higher mFI groups. GF and SSI did not statistically differ between the frailty groups (P >.05). Conclusion: Preoperative mFI assessment may be used as an additional screening tool for risk stratification among LEB patients.[16]

In 2017, **Tyler S. Wahl, et al.** conducted a retrospective cohort study to see the association of the Modified Frailty Index With 30-Day Surgical Readmission Adult patients who underwent surgery and were discharged alive from Veterans Affairs hospitals for orthopaedic, general, and vascular conditions between October 1, 2007, and September 30, 2014, with a postoperative length of stay between 2 and 30 days were included. The study sample was 236,957 surgical procedures. The 30-day unplanned readmission rate is the primary outcome of interest. Any 30-day pre- or post-discharge complication, 30-day post-discharge mortality, and 30-day

emergency department visit were considered secondary outcomes. Frailty, as determined by the 11 variables on the mFI. The mFI was associated with readmission (odds ratio [OR], 1.11; 95% CI, 1.10-1.12). Unadjusted rates of overall 30-day readmission (26 262 [11.1%]), post-discharge emergency department visit (34 204 [14.4%]), any predischarge (13 855 [5.9%]) or post-discharge (14 836 [6.3%]) complication, and post-discharge mortality (1985 [0.8%]) varied by frailty in a dose-dependent fashion. In analysis by individual mFI components using Harrell ranking, impaired functional status, identified as non-independent functional status (OR, 1.16; 95% CI, 1.11-1.21; P < .01) or having a residual deficit from a prior cerebrovascular accident (OR, 1.17; 95% CI, 1.11-1.22; P < .01), contributed most to the ability of the mFI to anticipate readmission compared with the other components. It was observed that the mFI is associated with poor surgical outcomes, including readmission, primarily due to impaired functional status. Targeting potentially modifiable aspects of frailty preoperatively, such as improving functional status, may improve perioperative outcomes and decrease readmissions.[17]

Another study by **Harveshp Mogal**, et al (2017) showed High mFI is associated with postoperative morbidity and mortality after PD and can aid in preoperative risk stratification. In the 2005–2012 NSQIP Participant Use File, all patients who underwent PD were identified. 9986 patients (age 65 ± 12 years, 48.8% female) who underwent PD were included in this study. 6.4% (n = 637) of these individuals had mFI levels above 0.27. Increased mFI was associated to higher prevalence of 30-day mortality and postoperative morbidity, both of which were statistically significant (p 0.001).[18]

**Cihad Tatar et al** in 2018 published a study which aimed to evaluate whether mFI could be utilized to predict readmissions after colorectal resection for patients with cancer by using

nationwide cohort. A total of 7337 Patients undergoing elective abdominal colorectal resection for colorectal cancer were reviewed from the American College of Surgeons National Surgical Quality Improvement Program (ACSNSQIP) procedure-targeted database (2010e2012). Eight hundred seventy-one (11.8%) patients were readmitted at least once within 30 days. The cut off value that resulted in the highest odds ratio for mFI was 3/11. They concluded an 11-point modified frailty index as measured in NSQIP correlates with readmissions after colorectal resection in patients with colon and rectal cancer.[19]

In 2018, **Kristen D. Pitts**, et al, conducted a retrospective study to understand the frailty measures among preoperative patients and describe how these can predict perioperative outcomes in patients with head and neck cancer. A total of 410 charts were queried between January 2014 and December 2017 of patients presented to an academic hospital following a surgical procedure for a head and neck cancer diagnosis. Charts were queried for preoperative medical diagnoses to calculate two frailty scores: the American College of Surgeons National Surgical Quality Improvement Program modified frailty index and the Johns Hopkins Adjusted Clinical Groups frailty index. The classification system used by the American Society of Anaesthesiologists was also examined as a predictor. The modified frailty index score significantly increased the odds of mortality (odds ratio = 1.475, P =.012), readmission (odds ratio = 1.472, P =.004), duration of stay (relative risk = 1.136, P =.001), and the number of perioperative complications. In this study population, the Adjusted Clinical Groups index did not significantly predict outcomes. This study demonstrated a significant increase in poor perioperative outcomes and mortality among patients with head and neck cancer and increased frailty, as measured by the modified frailty index.[20]

In 2020, **Yun Chen**, et al, did observational on 383 patients who were admitted for main

elective TJA under general anaesthesia between January 2018 and December 2019 are included in the study. POD and delayed neurocognitive recovery were evaluated for each enrolled patient in accordance with the criteria provided by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (2013). The overall incidence of POD and the delayed neurocognitive recovery in this sample were 17.2% (66/383) and 24.8% (95/383), respectively. According to their findings from the multivariate logistic regression analysis, older age (72 years) and a higher mFI level (0.18) were 2 independent risk variables for both POD and a delayed neurocognitive recovery in elderly patients after TJA. It was concluded that the mFI may be a promising predictor for both POD and delayed neurocognitive recovery in elderly subjects following TJA. The preoperative mFI evaluation offers significant potential for clinical application and can be utilized for risk stratification.[21]

A study by **Maarten J.H. Voskamp et al** in 2020, studied the possible correlation between the mFI in cystectomy patients with MIBC and serious complications 30 and 90 days postoperatively. A prospective database of 109 MIBC patients who underwent a cystectomy from January 2012 to August 2017 was analyzed. The odds ratio of the mFI for complications for 90 days was 1.5 (95% confidence interval 1.1-2.1, $p = 0.008$) and within 30 days was 1.5 (95% confidence interval 1.1-2.1, $p = 0.010$). Patients with Clavien-Dindo $\geq 3$ at 30 and 90 days postoperatively had a higher mFI compared to patients with Clavien-Dindo $< 3$. They found that a high mFI is associated with postoperative complications and mortality. [22]

**Konstantinos A. Zorbas et al** in 2020 conducted a retrospective study to assess the mFI as a preoperative predictor of short-term postoperative complications and 30-day mortality in patients undergoing gastrectomy for non-bariatric diseases. Database of patients who underwent total or partial gastrectomy from 2005 to 2011 were obtained from the American

College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) . Based on the mFI score, the population was divided into the following four groups: non-frail (mFI 0), low-frail (mFI 1), intermediate-frail (mFI 2), and frail (mFI ≥3). Postoperative complications and 30-day mortality were assessed. Mortality rates increased with mFI score (from 1.2% in the non-frail group to 10.7% in the frail group, P<0.001), overall morbidity (26.7% vs. 51.1%, P<0.001), postoperative Clavien Dindo IV complication (6% vs. 24.6%, P<0.001), serious complications (19.3% vs. 42.6%, P<0.001), sepsis-related complications (8.4% vs. 16.4%, P<0.001), cardiopulmonary complications (5% vs. 20.7%, P<0.001) and failure to rescue (5.7% vs. 21.8%, P<0.001). They concluded as higher mFI score in patients undergoing non bariatric gastrectomy, is associated with a step wise greater risk of postoperative morbidity and mortality.[23]

# AIMS & OBJECTIVES

**AIM:** To evaluate the association of frailty with postoperative outcomes in adultpatients undergoing elective non-malignant abdominal surgeries under general or neuraxial anaesthesia.

## PRIMARY OBJECTIVES

1. To evaluate the association of modified frailty index (mFI) with postoperativecomplications (as defined by Clavien-Dindo classification) in adult patients undergoing elective non-malignant abdominal surgeries under general or neuraxial anesthesia.
2. To estimate and compare the postoperative complication grade (as defined by Clavien-Dindo classification) in adult patients with different grades of frailty administered general versus neuraxial anesthesia.

## SECONDARY OBJECTIVES

1. To estimate and compare the incidence of 30-days readmission in adult patients, with different grades of frailty (mFI), undergoing elective non-malignant abdominal surgeries under general or neuraxial anesthesia
2. To estimate and compare the incidence of 30-days mortality in adult patients, withdifferent grades of frailty (mFI), undergoing elective non-malignant abdominal surgeries under general or neuraxial anesthesia.

# MATERIALS AND METHODS

## STUDY DESIGN

This is a single-centre, prospective observational cohort study conducted in the Department of Anesthesiology, All India Institute of Medical Sciences, Bhopal over a period of 18 months.

## SOURCE OF DATA

Patients coming for elective non-malignant abdominal surgery to All India Institute of Medical Sciences, Bhopal, India.

## INCLUSION CRITERIA-

1. Patients posted for elective non-malignant abdominal surgery
2. Patients of age > 18 years of either gender belonging to ASA I, II & III class.

## EXCLUSION CRITERIA

1. Patient refusal
2. Emergency surgery
3. Prolonged surgeries extending beyond 4 hours
4. Missing data on age, loss to follow-up
5. Pregnancy
6. General anesthesia given as rescue after failed spinal anesthesia

## METHODOLOGY

This is a single-centre prospective observational cohort study. A total of 125 patients, aged above 18 years of either sex and belonging to the American Society of anesthesiologists physical status classes I, II, and III, posted for elective non-malignant abdominal surgeries under general anesthesia or central neuraxial blockade, were enrolled in the study from February 2022 to July 2023. Institutional human ethics committee approval was sought before starting the study. A patient information sheet was handed over to all the subjects a day prior to the scheduled procedure. Written and informed consent for the conduct of the study was obtained from all the subjects after explaining the procedure.

All included patients have undergone routine preoperative evaluation, and a modified frailty index score was calculated for each patient. On the day of surgery, all patients received either general or neuraxial anesthesia as per standard protocol, taking into consideration the preoperative status as well as the site and duration of the surgery. Our study started from the immediate postoperative period until 30 days after surgery. Any complications from the immediate postoperative period until one month after surgery were noted. The length of the hospital stay was also noted. After discharge from the hospital, the patients were followed up telephonically for the duration of 30 days (twice in a 15-day interval) after surgery to inquire about readmission due to any complications or mortality.

The study outcomes were

### Primary outcomes:

1. Discriminative ability of mFI through AUC/ROC curves in predicting minor or major postoperative complications in patients undergoing elective non- malignant abdominal

surgeries under anesthesia.

2. Estimation of incidence rate and Odds ratio of postoperative complications in two anesthetic techniques (i.e. General versus Neuraxial anesthesia) in relation to different grades of frailty in patients undergoing elective non-malignantabdominal surgeries.

**Secondary Outcomes:**

1. Incidence and Odds ratio for 30-day readmission in adult patients with different grades of frailty, undergoing elective non-malignant abdominalsurgeries under general or neuraxial anesthesia.

2. Incidence and Odds ratio for 30-day mortality in adult patients with different grades of frailty, undergoing elective non-malignant abdominal surgeriesunder general or neuraxial anesthesia.

**Definition of the Modified Frailty Index (mFI)**

The preoperative variables within the National Surgical Quality Improvement Program (NSQIP) dataset were reviewed to determine an mFI for each patient. The mFI, described previously by Velanovich et al. includes the following 11 items in the NSQIP: diabetes; functional status (not independent); chronic obstructive pulmonary disease or pneumonia; congestive heart failure; history of myocardial infarction; hypertension requiring medication; peripheral vascular disease or rest pain; impaired sensorium; history of either transient ischemic attack or cerebrovascular accident; history of cerebrovascular accident with neurologic deficit; and prior percutaneous coronary intervention, previous coronary surgery, or history of angina. Each item wasallocated the same weight (1 point) in the

calculation of the index. The mFI is then calculated as total points as the sum of all the items divided by 11. For the purpose of analysis, patients with mFI score of 0-0.09 will be considered "robust",0.09-0.18 "mildly frail", 0.18-0.27 "frail" and ≥ 0.27 will be considered as "significantly frail". This cut-off of 0.27 is selected based on prior published work on the mFI.[8]

**Definition of postoperative complications**

Postoperative complications are defined by Clavien-Dindo Classification

**Grade 1 & 2** are considered as **minor** complications

**Grade 3, 4 & 5** are considered as **major** complications.

*CD grade 1 complications:*

- Mild Postoperative Nausea
- Mild Respiratory impairment (requiring supplemental oxygen by facemask
- Mild Cardiac impairment (Sinus bradycardia/tachycardia, mild hypotension)
- Mild Renal impairment (Slightly decreased urine output corrected with fluid bolus)
- Mild hepatic impairment (raised SGOT/SGPT < 3 times the normal range)
- Minor bleeding, mild anemia
- Mild Surgical Site Infection (SSI)

These complications typically follow a standard postoperative course and managed with administration of fluids and oxygen but without pharmacological intervention.

*CD grade 2 complications:*

- Moderate Respiratory impairment (Nebulization, Continuous positive airway pressure, bronchodilators)
- Cardiovascular impairment (arrhythmia such as VPCs (ventricular premature complexes), Hypotension/hypertension requiring pharmacological intervention)
- Moderate Renal impairment (Diuretics, Dose readjustment of nephrotoxic drugs)
- Moderate Hepatic impairment (raised SGOT/SGPT > 3 times the normal range)
- Moderate to severe anemia requiring transfusion.
- SSI requiring antibiotic escalation.

These complications require pharmacological intervention, blood transfusion, or total parenteral nutrition.

*CD Grade 3 Complications:*

- Complications necessitating endoscopic, radiological, or surgical intervention.

*CD Grade 4 Complications:*

- ICU admission and management
- CNS complications
- Single or multiorgan dysfunction

*CD Grade 5 Complications:*

- Complications leading to death

**Type of surgeries**

Abdominal surgeries were classified as minor, intermediate and major surgeries.

- Minor surgeries: defined as Open inguinal surgery, stoma reversal
- Intermediate: Laparoscopic surgeries, Incisional Hernia, other superficial abdominal surgeries
- Major: Intra and extraperitoneal abdominal surgeries such as Splenectomy, Nephrectomy, liver abscess, subacute intestinal obstruction, total abdominal hysterectomy and vascular surgery.

**Definition of the Re-admission and Mortality**

Re-admission is defined as hospital admission due to any complaint within 30 days after surgery. Mortality was defined as death within 30 days after surgery

**SAMPLE SIZE CALCULATION:**

Sample size was calculated considering our primary objective of testing feasibility of using modified frailty index scores to predict postoperative complications.ROC (receiver operative characteristics of analysis) for frailty score is assessed for postoperative complication. We have calculated AUC (area under curve) for frailty score.

To estimate sample size requirement for AUC, formula is as follows:

$$n = \frac{Z_{\frac{\alpha}{2}}^2 V(\widehat{AUC})}{d^2}$$

$$n\mathrm{Var}(\widehat{AUC}) = V(AUC) = (0.0099 \times e^{-a^2/2}) \times (6a^2 + 16) \qquad (7.4)$$

where $a = \varphi^{-1}(AUC) \times 1.414$ and $\varphi^{-1}$ is the inverse of standard cumulative normal distribution.

Estimated from binormal approximation

From previous literature, AUC was reported at around 0.7. To estimate it with relativeerror of 10%, ie 95% confidence interval of 0.63 to 0.77, required sample is 114.

Considering loss to follow-up of around oblique non-response rate of 10 %, finalrequired sample size is 125.

**DATA ANALYSIS**

The study period was 18 months. All patients meeting the inclusion criteria were enrolled in the study.

The collected data were transformed into variables, coded and entered in Microsoft Excel. Data were analyzed and statistically evaluated using SPSS-PC-25 version. Normal distribution of different parameters was tested by the Shapiro-Wilk normality test.

Quantitative data was expressed in mean±standard deviation and difference between mean of more than two groups were compared by ANNOVA test. Qualitative data were expressed in frequency and percentage and statistical differences between the proportions were tested by chi square test or Fisher's exact test. ROC curve was prepared using MFI for prediction of major complications. Cut off value was calculated using Youden Index and based on cut off value sensitivity, specificity, positive predictive value and negative predictive value was calculated. Spearman correlation coefficient was used to see correlation between different quantitative parameters. P' value less than 0.05 was considered statistically significant

# RESULTS

A total of 125 patients underwent non-malignant abdominal surgery during the study period, of which 66 (52.8%) per cent were female and 59 (47.2%) were male. Demographics, type of surgery, and anesthetic techniques were analysed in an attempt to investigate possible confounding factors.

For analysis, patients were stratified into four groups: 18-35 years old (group 1), 36-50 years (group 2), 51-65years (group 3), and >65 years (group 4) (Table1) in an order to cancel the bias generated due to age-specific frailty. These groups were compared according to their demographic characteristics, type of surgery and anesthetic technique.

**Table 1: Age wise distribution of baseline characteristics**

| | **18-35 years (n=21)** | **36-50 years (n=38)** | **51-65 years (n=40)** | **>65 years (n=26)** | **∗p value** |
|---|---|---|---|---|---|
| **Gender** | | | | | |
| Male (n=59) | 9 (42.9%) | 16 (42.1%) | 20 (50%) | 14 (53.8%) | 0.76 |
| Female (n=66) | 12 (57.1%) | 22 (57.9%) | 20 (50%) | 12 (46.2%) | |
| **Type of surgery** | | | | | |
| Minor (n=40) | 2 (9.5%) | 11 (28.9%) | 12 (30%) | 15 (57.7%) | **0.001** |
| Intermediate (n=49) | 11 (52.4%) | 10 (26.3%) | 17 (42.5%) | 11 (42.3%) | |
| Major (n=36) | 8 (38.1%) | 17 (44.7%) | 11 (27.5%) | 0 | |
| **Anesthesia technique** | | | | | |
| Neuraxial (n=30) | 4 (19%) | 11 (28.9%) | 5 (12.5%) | 10 (38.5%) | **0.08** |

| | | | | | |
|---|---|---|---|---|---|
| General (n=95) | 17 (81%) | 27 (71.1%) | 35 (87.5%) | 16 (61.5%) | |
| **Postop complications** | | | | | |
| Minor (n=61) | 8 (38.1%) | 18 (47.4%) | 21 (52.5%) | 14 (46.2%) | **<0.01** |
| Major (n=36) | 1 (4.8%) | 12 (31.6%) | 11 (27.5%) | 12 (53.8%) | |

Data expressed as n (%); ∗Chi-square test.

The table shows patient demographics and surgical characteristics for various age groups, along with p-values to evaluate statistical significance. Several inferences can be drawn from this data.

In terms of gender distribution, the p-value of 0.76 indicates that there is no significant difference in gender representation among the age groups. This suggests that both the sexes were equally distributed among groups. (Figure 1)

The type of surgery performed shows a significant association with age. The p-value of 0.001 indicates a strong association. Minor and intermediate surgeries are more prevalent in the >65 years group, while major surgeries are notably absent in this group (Figure 2). This implies that older patients tend to undergo less invasive procedures and managed with conservative approach.

The choice of anesthesia technique exhibits some variation depending on the surgical site and procedure. In upper abdominal and intraperitoneal surgeries, general anesthesia was preferred technique of choice while in lower abdominal and extraperitoneal surgeries, neuraxial anesthesia was preferred. Thus, both the techniques was uniformly distributed and no significant difference was found among different age groups (Figure 3).

The postoperative complications showed significant association with age ($p<0.01$). Both minor and major complications increase with age, while major complications are most prominent in the >65 years group. This suggests that older patients may be at a higher risk of both minor and major postoperative complications (Figure 4).

Postoperative outcomes were assessed in terms of minor and major complications as per Clavien Dindo classification, readmission rate, and 30-day mortality rate. Table 1 provides valuable insights into the relationship between the Modified Frailty Index (mFI) scores and various postoperative complications, grouped as per Clavien-Dindo (CD) classification.

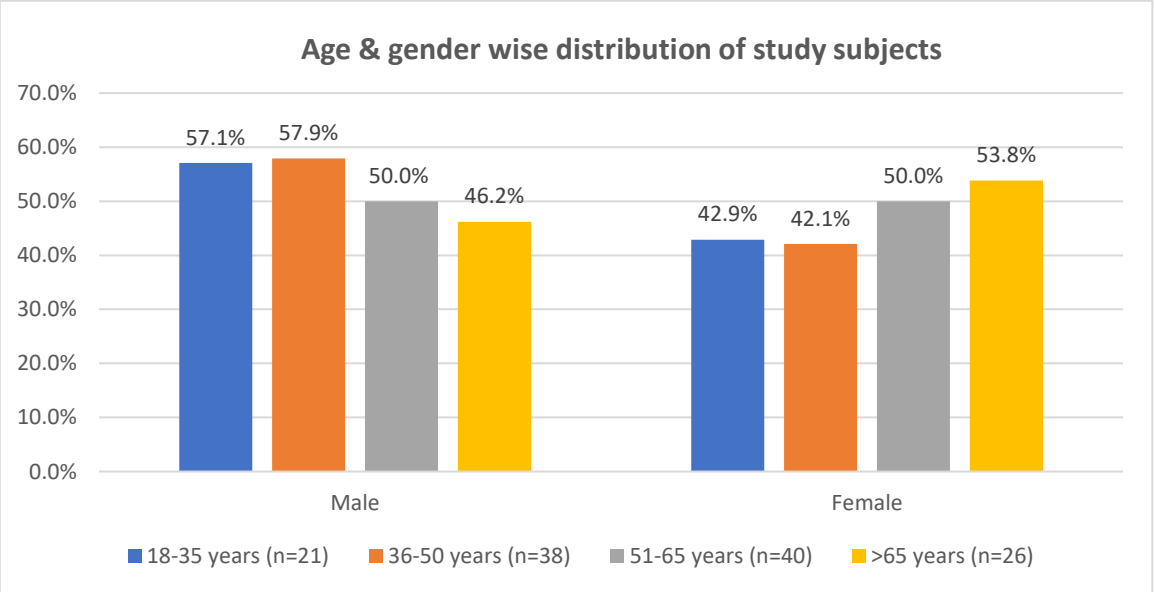



**Figure 1: Gender distribution in different age groups.**

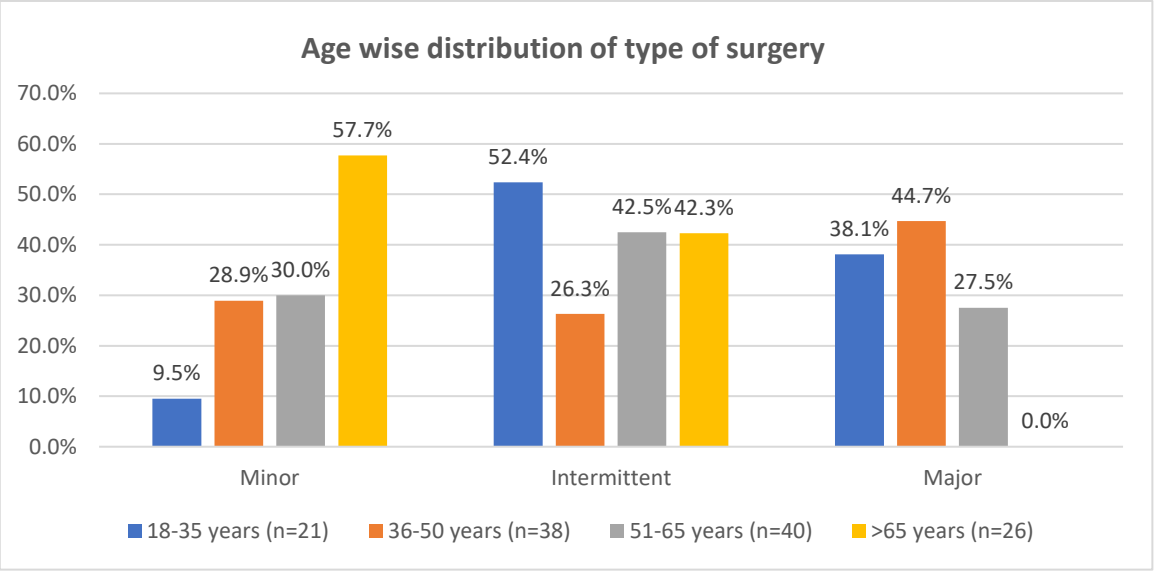



**Figure 2: Distribution of minor, intermediate and major surgery in different age groups.**

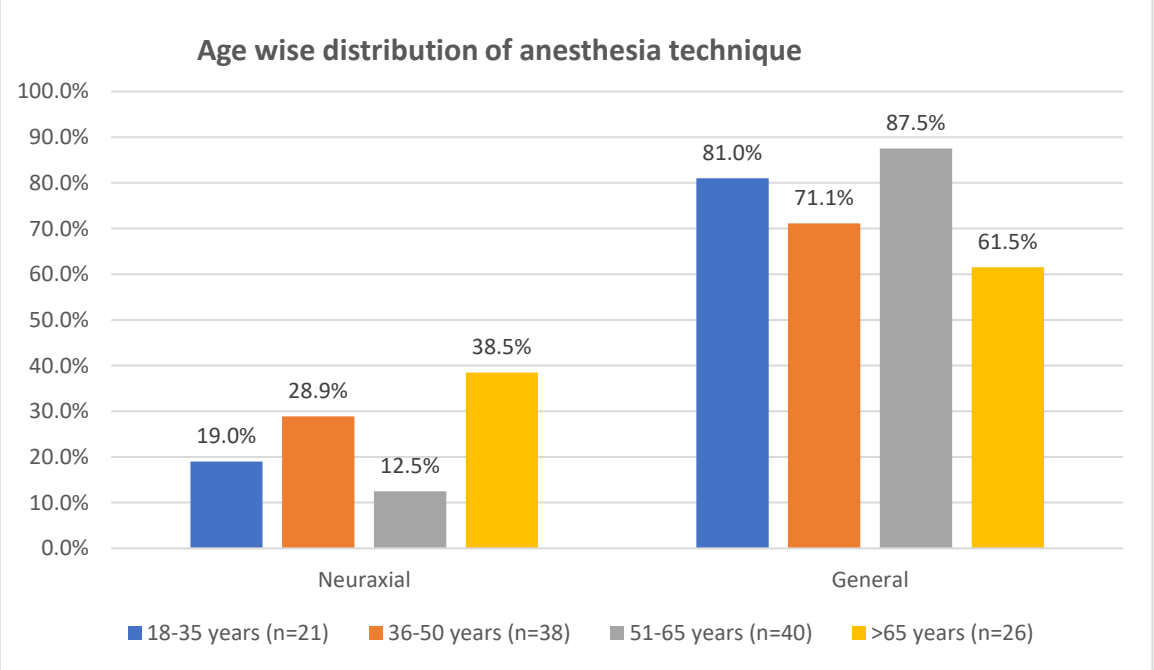



**Figure 3: Distribution of anesthetic technique in different age groups.**

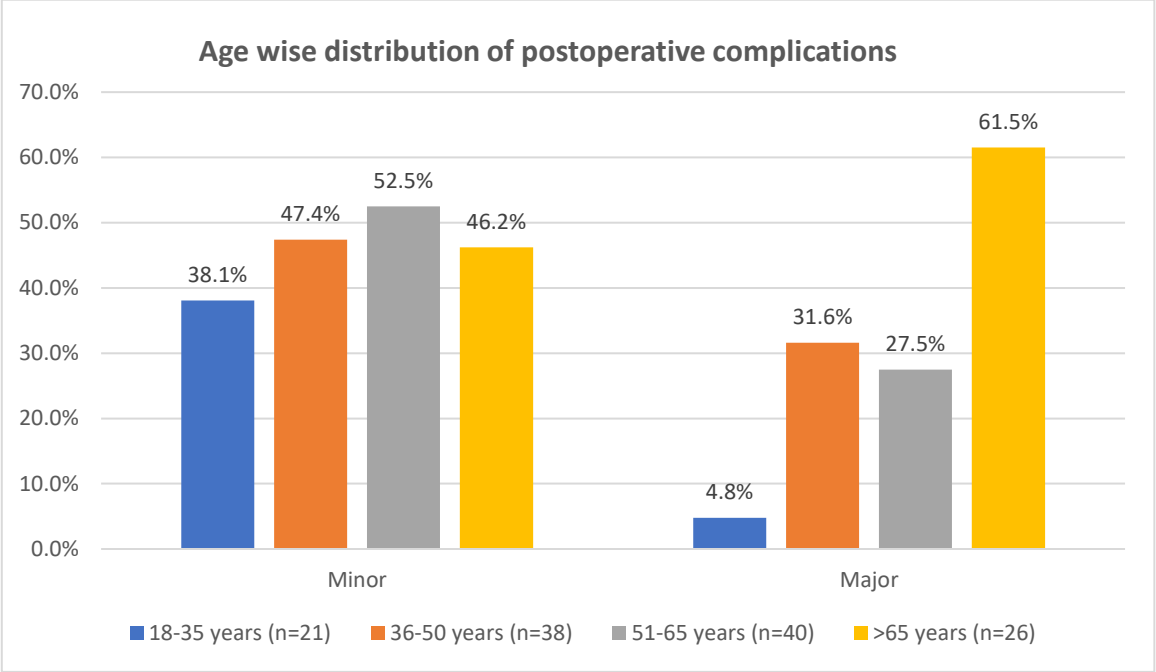



**Figure 4: Distribution of minor and major complications in different age groups.**

**Primary Outcomes:**

1. Discriminative ability of mFI through AUC/ROC curves in predicting major postoperative complications

a) *Sensitivity and specificity of mFI for prediction of major postoperative complications.*

The ROC-AUC curve shows that at the cutoff value of 0.18; the sensitivity and specificity of modified frailty index to predict major postoperative complications is 86.11% and 88.76% respectively with high negative predictive value of 94.05%. (Figure 5) Thus, mFI can be

used to predict the postoperative complications with acceptable accuracy; with lower mFI leading to no or minor postoperative complications. (Figure 6)

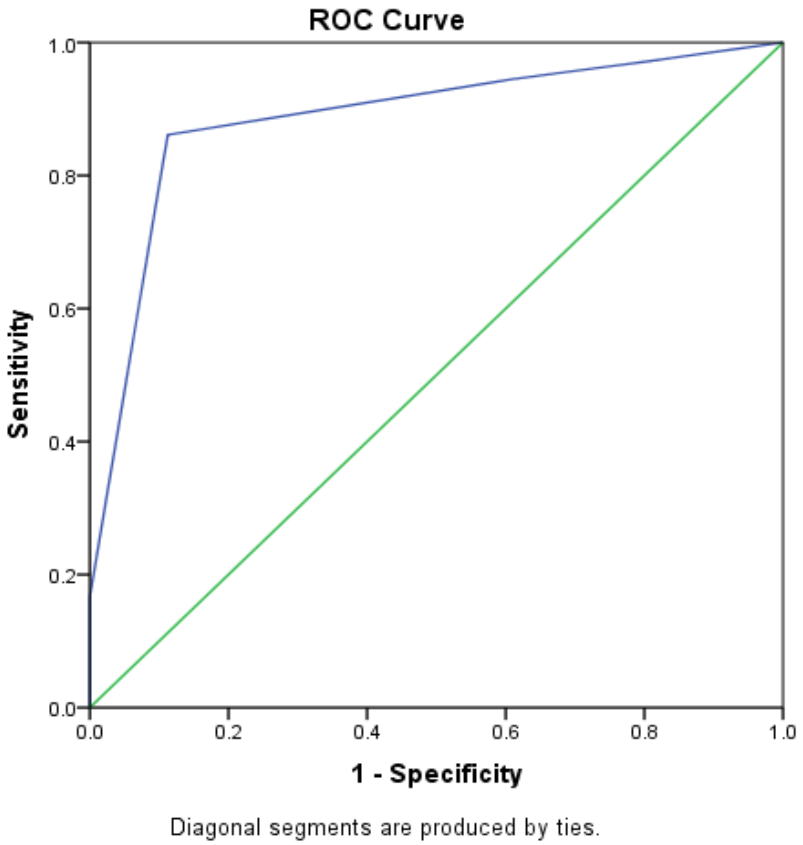



**Figure 5: ROC curve analysis using MFI for prediction of major complications**

**Table 2: Values derived from ROC-AUC curve**

| | Value | 95% CI |
|---|---|---|
| AUC | 0.88 | 0.81-0.95 |
| P value | <0.001 | |
| Cut off value | 0.18 | |
| Sensitivity | 86.11% | 70.50% to 95.33% |
| Specificity | 88.76% | 80.31% to 94.48% |
| Positive Likelihood Ratio | 7.66 | 4.21 to 13.94 |
| Negative Likelihood Ratio | 0.16 | 0.07 to 0.35 |
| Positive Predictive Value | 75.61% | 63.02% to 84.94% |
| Negative Predictive Value | 94.05% | 87.47% to 97.28% |
| Accuracy | 88.00% | 80.98% to 93.13% |

AUC= Area under curve; CI = Confidence interval

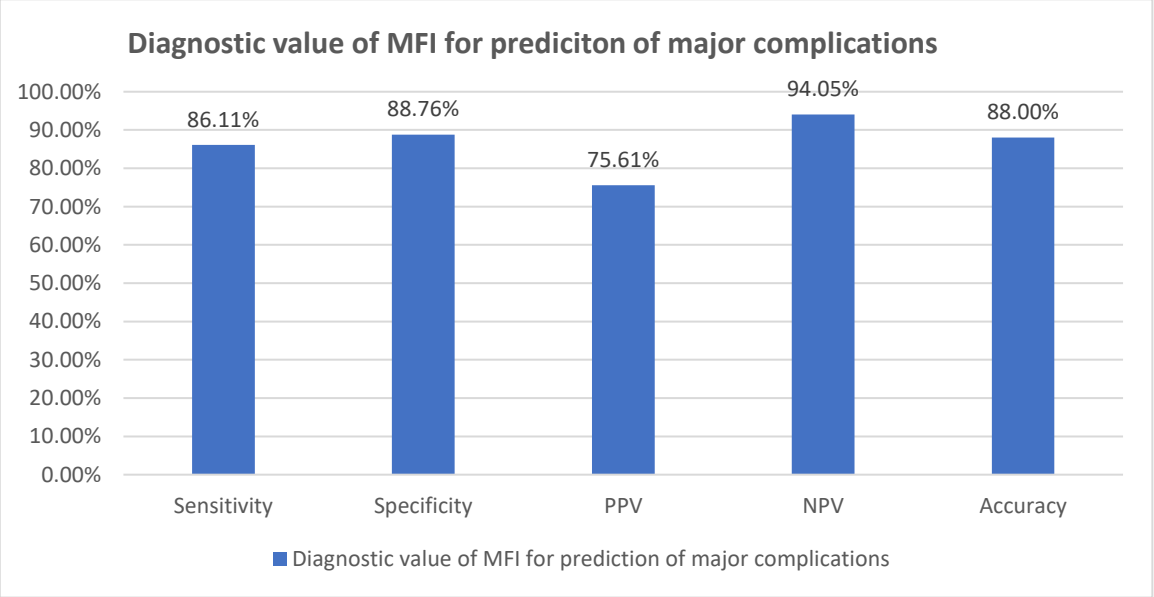



**Figure 6: Sensitivity, specificity and predictive value of mFI for major postoperative complications.**

*b) Incidence of postoperative complications as per Clavien Dindo classification across different mFI scores*

Table 3 demonstrates a clear relationship between frailty, as measured by the mFI, and the risk of various postoperative complications across different CD grades. It emphasizes the importance of assessing and addressing frailty in surgical patients to better predict and manage their postoperative outcomes.

**Table 3: Association of mFI scores with postoperative complications as per Clavien-Dindo classification.**

| | **mFI=0 (n=18)** | **mFI=0.09 (n=19)** | **mFI=0.18 (n=47)** | **mFI=≥0.27 (n=41)** | **∗p value** |
|---|---|---|---|---|---|
| **CD grade I** | | | | | |
| Respiratory impairment | 0 | 0 | 17 ( 36.17%) | 6 (14.63%) | **<0.001** |
| Renal impairment | 0 | 2 (10.53%) | 4 (8.51%) | 7 (17.07%) | 0.23 |
| CVS impairment | 0 | 1 (5.26%) | 14 (29.79%) | 5 (12.2%) | **<0.01** |
| Hepatic impairment | 0 | 2 (10.53%) | 6 (12.77%) | 1 (2.44%) | 0.15 |
| Minor bleeding/Anemia | 0 | 2 (10.53%) | 4 (8.51%) | 11 (26.83%) | **0.01** |
| Mild SSI | 0 | 4 (21.05%) | 18 (38.3%) | 10 (24.39%) | **0.01** |

| | | | | | |
|---|---|---|---|---|---|
| Postop Nausea Vomiting | 0 | 3 (15.79%) | 3 (6.38%) | 0 | **0.04** |
| **CD grade II** | | | | | |
| Respiratory impairment | 0 | 1 (5.26%) | 4 (8.51%) | 19 (46.34%) | **<0.001** |
| Renal impairment | 1 (5.56%) | 0 | 0 | 6 (14.63%) | **0.01** |
| CVS impairment | 1 (5.56%) | 0 | 1 (2.13%) | 13 (31.71%) | **<0.001** |
| Hepatic impairment | 0 | 0 | 1 (2.13%) | 4 (9.76%) | 0.13 |
| Blood transfusion (CD grade II) | 0 | 1 (5.26%) | 3 (6.38%) | 6 (14.63%) | 0.22 |
| TPN | 0 | 0 | 3 (6.38%) | 9 (21.95%) | **<0.01** |
| Moderate SSI | 0 | 0 | 0 | 8 (19.51%) | **0.001** |
| Postop Nausea Vomiting | 0 | 0 | 2 (4.26%) | 10 (24.39%) | **0.001** |
| **CD grade III** | 0 | 0 | 0 | 0 | - |
| **CD grade IV/ICU** | 1 (5.56%) | 1 (5.26%) | 3 (6.38%) | 31 (75.61%) | **<0.001** |

Data expressed as n (%); ∗Chi-square test.

Increasing mFI was associated with a higher incidence of both minor and major complications ($p$ <.001). Among patients ($n$ =18) with mFI 0, only one patient had experienced a major complication. Patients with mFI of 0.09 (n=19), 9 (47.36%) experienced a minor complication, and 1 (5.2%) experienced a major complication. Of patients with an mFI of 0.18 (n = 47), 42 (89.36%) experienced a minor complication, and 3 (6.38%) experienced a major complication. Of patients with an mFI of 0.27 ($n$ =35), 10 (28.57%) experienced a minor complication, and 25 (71.4%) experienced a major complication. Six patients had mFI greater than 0.27; all of which experienced major complications, like postoperative ICU admission. Thus, mFI of ≥0.27 predicted the development of a major complication.

It can be deduced from above data that mFI of 0.18 or higher remained an independent preoperative predictor of any complication, and mFI of ≥0.27 predicted major postoperative morbidity. The frailty index was a strong predictor of major morbidity. Clavien Dindo Grade IV complications occurred in 36(28.8%) patients during their hospital stay.

The rates of Clavien Dindo Grade IV complication were 5.5%, 5.2%, 6.38% and 75.6% for mFI scores of 0, 0.09, 0.18, and ≥0.27 respectively (p<0.001) (Figure 7)

When analyzing CD grade I complications, it is evident that as the mFI score increases, the incidence of minor respiratory and cardiovascular impairment, minor bleeding/anemia, and mild surgical site infections (SSI) also increases. The p-values for these associations are statistically significant, indicating that higher mFI scores are associated with a greater likelihood of these complications. This suggests that frailty, as measured by the mFI, is a predictor of these CD grade I complications.

For CD grade II complications, a similar pattern emerges. Higher mFI scores are associated with an increased risk of respiratory impairment, renal impairment, CVS impairment, postoperative nausea and vomiting and need for blood transfusion and total parenteral nutrition (TPN). These associations are statistically significant, reinforcing the idea that frailty plays a role in predicting CD grade II complications. None of our patient had CD grade III complications and did not require any surgical, endoscopic or radiological intervention.

For CD grade IV/ICU complications, there is a substantial increase in the incidence of these complications as the mFI score rises, with a highly significant p-value. This strongly suggests that higher frailty scores are associated with a higher likelihood of severe postoperative complications requiring intensive care. (Figure 7)

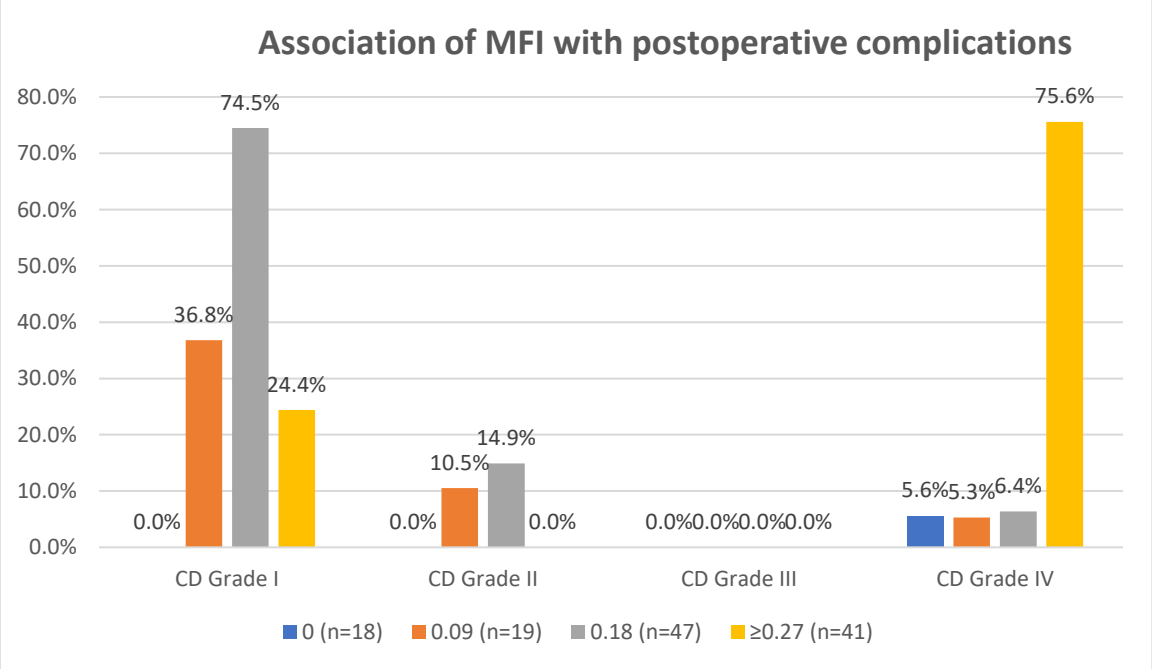



**Figure 7: Incidence of postoperative complications as per Clavien-Dindo classification in patients with different mFI**

**Table 4 : Correlation of mFI with CD grade complications in different age group**

| | **MFI** | **CD grade** | **Correlation coefficient** | **∗r value** |
|---|---|---|---|---|
| 18-35 years | 0.06±0.07 | 0.62±0.97 | 0.78 | **<0.001** |
| 36-50 years | 0.18±0.09 | 1.87±1.58 | 0.69 | **<0.001** |
| 51-65 years | 0.18±0.08 | 1.68±1.52 | 0.81 | **<0.001** |
| >65 years | 0.23±0.09 | 2.42±1.50 | 0.67 | **<0.001** |

*Spearman correlation coefficient; mFI = Modified frailty index; CD grade = Clavien Dindo grade

Table 4 illustrates the correlation between the Modified Frailty Index (MFI) and Clavien-Dindo (CD) grade across different age groups. The correlation coefficients (r values) reveal the strength and direction of the association between MFI and CD grade within each age category.

- Age and Frailty: As age increases, there is a clear trend of higher MFI scores, indicating an association between age and frailty. This is supported by the MFI values, which progressively increase from the youngest age group (18-35 years) to the oldest (>65 years).

- Frailty and Postoperative Complications: The table demonstrates a statistically significant correlation between MFI and CD grade across all age groups (indicated by the p-values of <0.001). Higher MFI scores are associated with higher CD grades,

suggesting that frailty is a strong predictor of postoperative complications.

- Strength of Correlation: The correlation coefficients (r values) for all age groups are statistically significant ($p < 0.001$), demonstrating a strong positive correlation between age, mFI, and CD grade.

**2.** Incidence of postoperative complications in neuraxial vs general anesthesia across different mFI scores

Table 5 depicts the incidence of postoperative complications between two anesthesia techniques (Neuraxial vs. General) and modified Frailty Index (mFI) scores.

**Table 5: Postoperative complications in different type of anesthesia at different MFI**

| | **Postoperative complications** | | **∗p value** |
|---|---|---|---|
| | **Neuraxial anesthesia (n = 30)** | **General anesthesia (n = 95)** | |
| **mFI=** 0 | 1 (11.1%) | 0 | 0.50 |
| **mFI=** 0.09 | 4 (66.7%) | 6 (46.2%) | 0.37 |
| **mFI=** 0.18 | 8 (80%) | 37 (100%) | 0.04 |
| **mFI=** 0.27 | 4(100%) | 31 (100%) | - |
| **mFI=** >0.27 | 1(100%) | 5 (100%) | - |

Data expressed as n (%); ∗Fischer's Exact test.

The following inferences can be drawn from this table

- Anesthesia technique: While there are some variations, the choice of anesthesia technique (Neuraxial vs. General) does not appear to have a consistent and significant impact on the occurrence of postoperative complications across different mFI groups. In some cases, patients with neuraxial anesthesia had fewer complications, while in others, general anesthesia had lower complication rates. However, these differences were not statistically significant (p-values > 0.05). While trends are evident, further research with larger sample sizes may be necessary to fully understand the implications of these preferences for anesthesia selection in different frailty categories.

- High-Frailty Patients: In the highest frailty group (mFI ≥0.27), both Neuraxial and General anesthesia showed similar complication rates, indicating that high-frailty patients are at significant risk of postoperative complications regardless of the anesthesia technique used.

This table highlights the strong association between frailty, as measured by mFI, and the risk of postoperative complications. While anesthesia type may influence complications in some cases, the impact is not consistent across all mFI groups. It underscores the importance of considering frailty when assessing the risk of postoperative complications and tailoring care plans accordingly, particularly for high-frailty patients who are at the greatest risk.
(Figure 8)

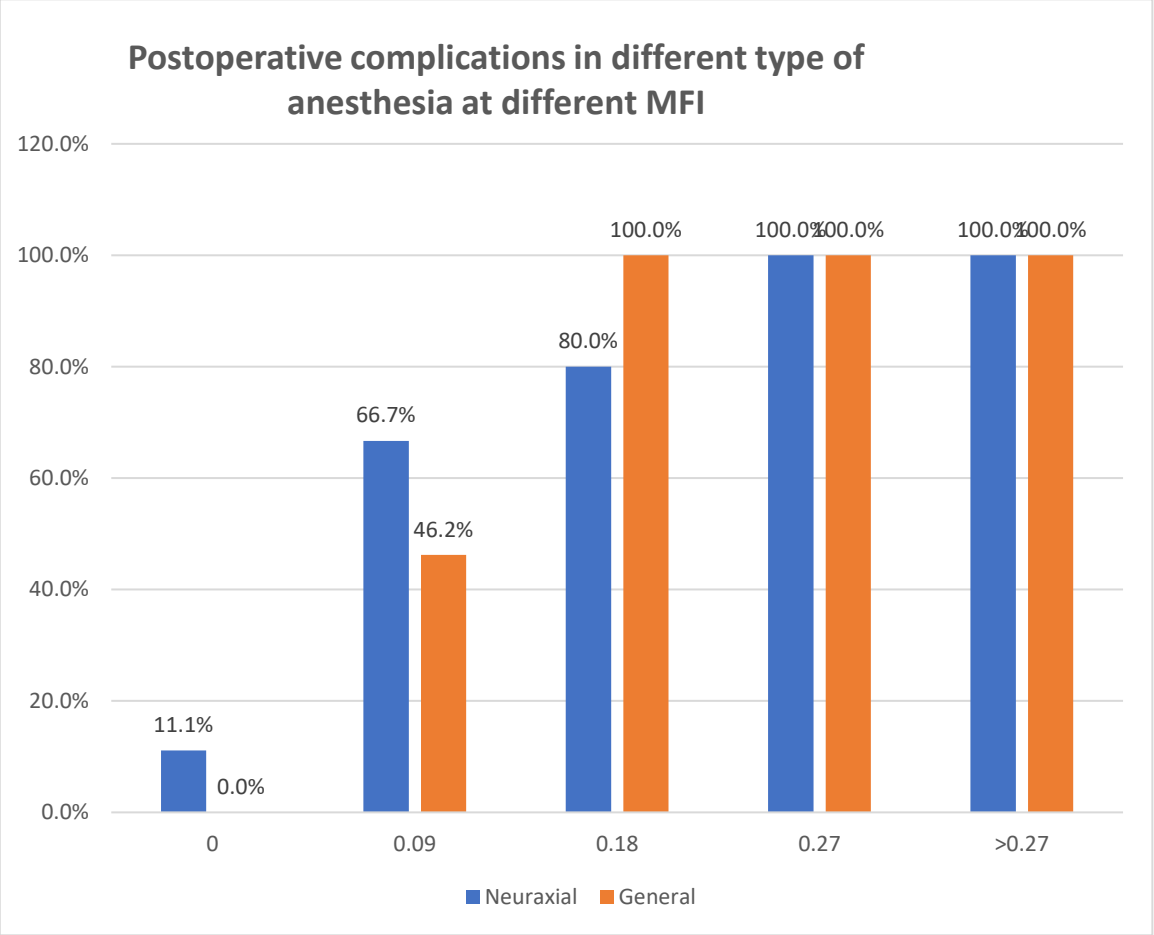



**Figure 8: Percentage of postoperative complications in patients with different mFI undergoing different type of anesthesia.**

**Table 6: Incidence of postoperative complications in general and neuraxial anesthesia in patients with low and high frailty index.**

| | **<0.27 with neuraxial (N=25)** | **<0.27 with general (N=59)** | **∗p value for <0.27 between neuraxial & general** | **≥0.27 with neuraxial (N=5)** | **≥0.27 with general (N=36)** | **∗p value for ≥0.27 between neuraxial & general** |
|---|---|---|---|---|---|---|
| **CD grade I** | | | | | | |
| Respiratory impairment | 4 (16%) | 13 (22.03%) | 0.76 | 1 (20%) | 5 (13.89%) | 1.0 |
| Renal impairment | 0 | 6 (10.17%) | 0.17 | 1 (20%) | 6 (16.67%) | 1.0 |
| CVS impairment | 4 (16%) | 11(18.64%) | 1.0 | 2 (40%) | 3 (8.33%) | 0.10 |
| Hepatic impairment | 1 (4%) | 7 (11.86%) | 0.42 | 0 | 1 (2.78%) | 1.0 |
| Minor bleeding/Anemia | 0 | 6 (10.17%) | 0.17 | 0 | 11 (30.56%) | 0.30 |
| Mild SSI | 5 (20%) | 17 (28.81%) | 0.58 | 0 | 10 (27.78%) | 0.31 |
| Postop Nausea Vomiting | 3 (12%) | 3 (5.08%) | 0.35 | 0 | 0 | -- |
| **CD grade II** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Respiratory impairment | 1 (4%) | 4 (6.78%) | 1.0 | 1 (20%) | 18 (50%) | 0.35 |
| Renal impairment | 1 (4%) | 0 | 0.29 | 1 (20%) | 5 (13.89%) | 0.56 |
| CVS impairment | 1 (4%) | 1 (1.69%) | 0.50 | 1 (20%) | 12 (33.33%) | 1.0 |
| Hepatic impairment | 0 | 1 (1.69%) | 1.0 | 0 | 4 (11.11%) | 1.0 |
| Blood transfusion | 0 | 4 (6.78%) | 0.31 | 0 | 6 (16.67%) | 1.0 |
| TPN | 0 | 3 (5.08%) | 0.55 | 0 | 9 (25%) | 0.56 |
| Moderate SSI | 0 | 0 | - | 0 | 8 (22.22%) | 0.56 |
| Postop Nausea Vomiting | 0 | 2 (3.39%) | 1.0 | 0 | 10 (27.78%) | 0.31 |
| **CD grade III** | 0 | 0 | - | 0 | 0 | - |
| **CD grade IV/ICU** | 1 (4%) | 4 (6.8%) | **1.0** | 3 (60%) | 28 (77.8%) | **<0.001** |

Data expressed as n (%); ∗Chi-Square Test and Fischer's Exact test

Table. 6 presents a comparison of postoperative complications (Clavien-Dindo grades I to IV/ICU) based on two factors: Modified Frailty Index (mFI) <0.27 and ≥0.27 and anesthesia technique (Neuraxial vs. General).

*For patients with mFI <0.27:*

- There are no significant differences in complications between Neuraxial and General anesthesia for CD grade I and II complications. Both anesthesia types seem to have similar outcomes.
- However, for CD grade IV/ICU complications, the difference is not statistically significant, indicating that anesthesia type doesn't significantly impact these severe complications.

*For patients with mFI ≥0.27:*

- CD grade I complications show no significant difference between Neuraxial and General anesthesia.
- Interestingly, for CD grade II complications, Neuraxial anesthesia appears to have fewer complications compared to General anesthesia, although this difference is not statistically significant.
- The most significant difference is observed in CD grade IV/ICU complications, where patients with mFI ≥0.27 who received general anesthesia had significantly higher complication rates compared to those with Neuraxial anesthesia ($p < 0.001$). (Figure 9)

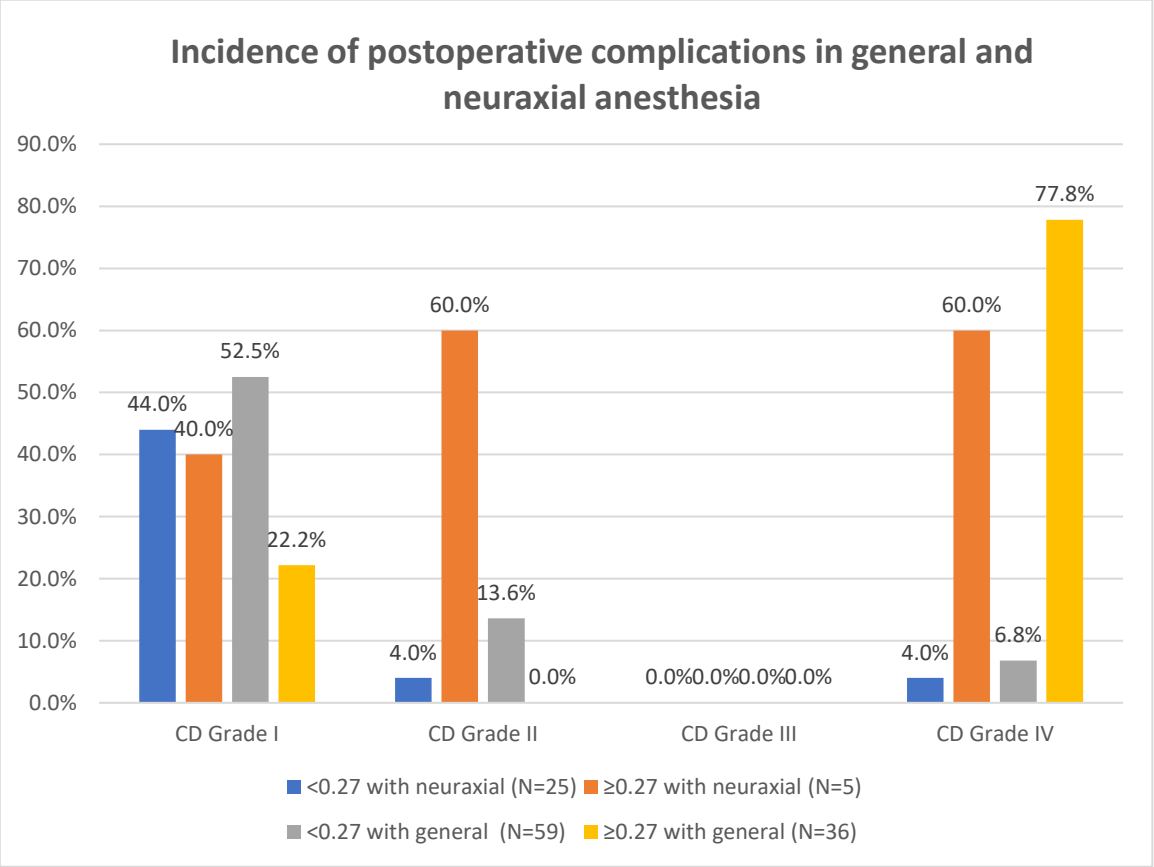



**Figure 9: Incidence of postoperative complications of different grades in patients with low (≤0.27) and high mFI (≥0.27) undegoing neuraxial and general anesthesia**

***Odds Ratio:*** In patients with mFI score ≤0.27 and ≥0.27, the odds ratio for postoperative complications in general vs neuraxial anesthesia is 1.74 (95% CI:0.18-16.44) and 2.33 (95% CI:0.33-16.46), respectively. This implies that in patients with mFI score ≤0.27, there is a 74% probability of postoperative complications in patients undergoing general anesthesia compared to neuraxial anesthesia. Similarly, this probability increases to 133%, if the mFI score is ≥0.27.

***Secondary outcomes:***

1. Incidence rate and Odds ratio of 30 days readmission in association with mFI

Table 7 illustrates a clear and significant association between the Modified Frailty Index (mFI) scores and the 30-day readmission following a surgical procedure. As the mFI increases, there is a progressive increase in the incidence of readmission within 30 days.

**Table 7: Association of mFI with 30 days readmission**

| | **mFI=0 (n=18)** | **mFI=0.09 (n=19)** | **mFI=0.18 (n=47)** | **mFI=≥0.27 (n=41)** | **∗p value** |
|---|---|---|---|---|---|
| **30 days readmission rate** | 0 | 1 (5.3%) | 1 (2.1%) | 17 (41.5%) | **<0.001** |

Data expressed as n (%); ∗Chi-square test.

Several key inferences which can be drawn from this data:

• Frailty and Re-admission: The data reveals a substantial and highly statistically significant trend. As the mFI score increases, there is a remarkable rise in the 30-day readmission rate. Patients with mFI scores of 0 have a negligible readmission rate, while those with mFI ≥0.27 have a significantly higher readmission rate of 41.5%. (Figure 10) This suggests that frailty, as measured by the mFI, is a strong predictor of the likelihood of readmission within 30 days.

• Clinical Implications: These findings have important clinical implications. They underscore the importance of assessing a patient's frailty level before surgical procedures to anticipate and mitigate the risk of readmission. High-frailty patients are at a substantially

greater risk of readmission, which may indicate more complex medical and surgical needs or a higher likelihood of postoperative complications.

- Resource Allocation: Hospitals and healthcare systems should consider these results when allocating resources for postoperative care and support. Patients with higher mFI scores may require more extensive follow-up and support to reduce the likelihood of readmission.

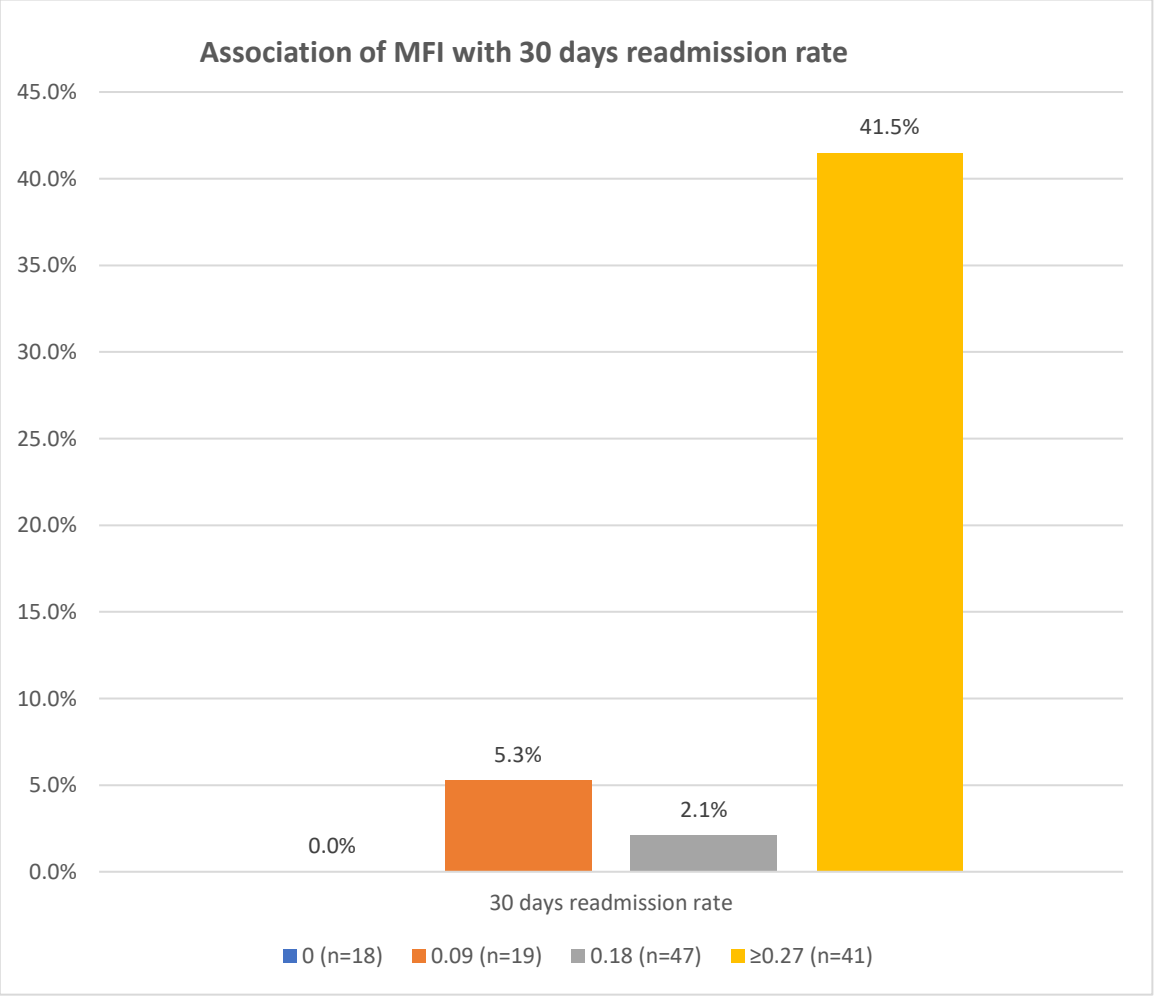



**Figure 10: Incidence of 30-day re-admission in patients of different mFI**

***Odds ratio:*** The odds ratio for 30-day readmission is 29.04 (95% CI: 6.26-134.68) in association with mFI.≥ 0.27. This implies that there is a 29 times increased probability of readmission in patients with mFI ≥ 0.27, as depicted with p value of <0.001.

2. Incidence rate and Odds ratio of 30 days mortality in association with mFI

There were no deaths in any of the MFI score groups (0, 0.09, 0.18, and ≥0.27) during the follow-up period of our study. Thus, association of mFI with mortality cannot be ascertained. However, we have collected data on the total duration of hospital stay of patients in each mFI group as depicted in Table 8.

**Table 8: Association of MFI with length of stay**

| | **mFI=0 (n=18)** | **mFI=0.09 (n=19)** | **mFI=0.18 (n=47)** | **mFI=≥0.27 (n=41)** | **∗p value** |
|---|---|---|---|---|---|
| **Length of stay (days)** | 3.61±1.42 | 5.53±1.42 | 6.02±0.79 | 8.0±2.59 | **<0.001** |

Data expressed as Mean±SD; ∗ANOVA test

The table illustrates a significant association between the Modified Frailty Index (mFI) scores and the length of hospital stay (in days) following surgical procedures. Several key inferences can be drawn from this data:

- Frailty and Length of Stay: There is a clear and substantial correlation between higher mFI scores and longer hospital stays. Patients with mFI scores of 0 have the shortest average length of stay at 3.61 days, while those with mFI ≥0.27 have significantly longer stays, with an average of 8.0 days. The p-value of <0.001 indicates strong statistical significance,

underscoring the impact of frailty on hospitalization duration. (Figure. 11)

- Clinical Implications: These findings have important clinical implications. High-frailty patients, as indicated by higher mFI scores, tend to require longer hospitalization. This may be due to increased postoperative complications, slower recovery, or the need for more extensive care.
- Cost and Resource Allocation: Longer hospital stays not only affect patient comfort but also have financial implications for healthcare systems. Hospitals may need to allocate more resources to care for high-frailty patients and develop strategies to enhance the efficiency of care delivery.

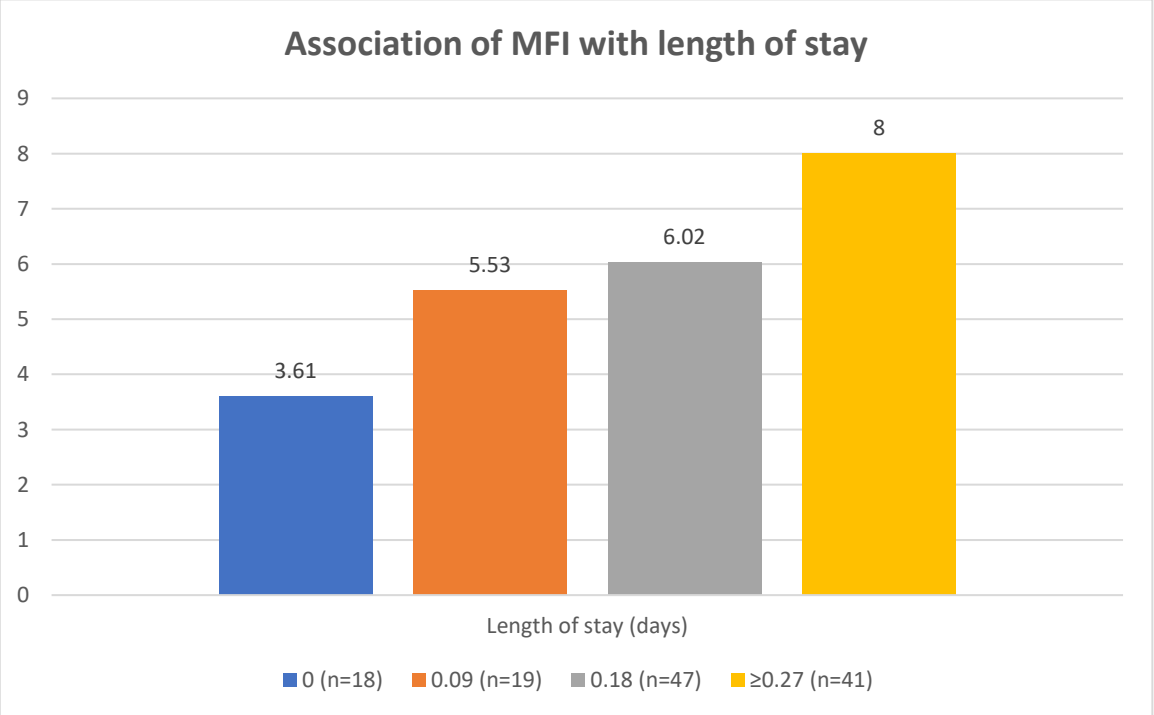



**Figure 11: Association of mFI with length of hospital stay**

# DISCUSSION

Frailty is considered to be a state of decreased physiologic reserves arising from cumulative deficits in multiple homeostatic systems that results in greater susceptibility and less resilience to physiologic stressors.[24] Importantly, although frailty traditionally has been described in the form of physical weakness as a function of aging, it is well known that besides chronological age, several other factors contribute to physiologic aging and determine functional reserve and response to stress.[25,26]

Both surgeons and anesthesiologists often put too much stress on a patient's age and not enough on an objective measure of physiologic reserve, whereas patients usually overestimate their ability to cope with major surgical stresses, which could result in unrealistic expectations of their outcome and recovery.(3) The mFI is a simple frailty assessment method that makes use of easily available historical variables that can be reliably and consistently collected in the preoperative setting.

To quantify frailty, there are two emerging models, the physical phenotypic model and the cumulative deficit model. **Fried et al.** described the physical phenotype. as the presence of unintentional weight loss, exhaustion, weakness (low grip strength), slow walking speed and low level of physical activity [1]. The cumulative deficit model is based on a comprehensive geriatric assessment with the assumption that the overall decline in function can be explained by the additive effect of co-morbidities. The rationale as to why the cumulative deficit model is more widely used has to do with the nature of its assessment, in which the variables are assessed objectively with true or false statements [27].

One of the largest studies utilizing the cumulative deficit model is the **Canadian Study of Health and Aging Frailty Index (CSHA-FI),** which examined 70 different variables for accurate identification of frail elderly people [28,29]. Several investigators have identified frailty as a predictor of perioperative complications. **Obeid NM et al**., who assessed a total of 58,448 colectomies using the National Surgical Quality Improvement Program (NSQIP) database, found that the modified frailty index (mFI) is an important predictor of ICU-level complications. The mFI utilizes 11 NSQIP variables derived from the Canadian Study of Health and Aging Frailty Index (CSHA-FI) and has been validated in several surgical specialties [9,11,30]

**Farhat et al.** demonstrated that an increased mFI was associated with an increased risk of mortality in emergency general surgery patients over the age of 60 years. In the same study, the mFI was a better predictor of mortality than increasing age or Amercian Society of Anesthesiology physical status classification system (ASA) score [31].

In our study, we used the modified frailty index, which is a cumulative deficit model derived from the Canadian Study of Health and Aging Frailty Index (CSHA-FI), for predicting postoperative morbidity and mortality.The results of the study indicate that age, gender, type of surgery, and anesthesia technique have varying associations with postoperative complications. Gender and anesthesia technique showed no significant differences in complication rates except in higher grades of mFI. However, age and type of surgery exhibited linear correlation with each other. Thus, older patients (>65 years) and those undergoing major surgeries had higher complication rates. Neuraxial anesthesia seemed to have a lower rate of minor complications than general anesthesia. These findings emphasize the importance of modifying surgical care and monitoring based on age and surgical

complexity to reduce postoperative complications, particularly for older patients and those undergoing major procedures.

The present study highlights the substantial impact of the Modified Frailty Index (mFI) on postoperative complications, emphasizing the importance of assessing frailty as a predictor of surgical outcomes. There is a consistent positive correlation in our study between higher Modified Frailty Index (mFI) scores and more severe Clavien-Dindo (CD) classification grades across all age groups. This indicates that as mFI increases, the risk of more severe postoperative complications also rises significantly, emphasizing the predictive value of mFI in assessing surgical outcomes. Patients with mFI $\geq$ 0.27 consistently experience more complications, particularly in CD grade II and IV/ICU, where the differences are statistically significant (p-values <0.001). Similar results were obtained by **Rushna et al** who conducted a study on 18,294 patients and concluded that mFI of $\geq$ 0.27 had rates of 4.1% and 7.1% for surgical site infections and Clavien Dindo IV complications, respectively ($p < 0.001$ for both). [15] Notably, in our study, respiratory and cardiovascular system (CVS) impairments are more prevalent in high-frailty groups. In patients with mFI of 0.18, the incidence of cardiovascular and respiratory complications of CD grade 1, was 29% and 36% which increases to 46% and 32% of CD grade 2, respectively in mFI >0.27. The incidence of postoperative SSI was 24% to 38% across different mFI. In a study done by **Eslami et al** revealed a similar trend in which incidence of postoperative SSI, myocardial infarction, cardiopulmonary events was 2.5%, 1.6%, and 3.1% respectively. [16] Though the trend was similar to our study but the incidence of complications is quite higher, which could be explained by the fact that we have included all the minor and major cardiovascular and

respiratory complications and not just major complications such as MI. There was increased incidence of MI, CPEs, and any morbidity ($P < .001$) among the higher mFI groups.

There were differences in complication rates between neuraxial and general anesthesia, but these disparities were not consistently significant, although the study does reveals significant differences in postoperative complications based on both mFI scores and anesthesia type. Patients with mFI ≥0.27, indicating higher frailty, consistently experienced more complications across Clavien-Dindo (CD) classification grades, regardless of anesthesia technique. Notably, high-frailty patients with general anesthesia had a significantly higher incidence of CD grade IV/ICU complications (77.8%) compared to those with neuraxial anesthesia (60%) (p-value <0.001). However, when comparing complications between neuraxial and general anesthesia within each mFI group, no significant differences were found except at mFI ≥ 0.18 (p=0.04) indicating that anesthesia technique does not independently impact these outcomes. The clinical significance of the result obtained at mFI ≥ 0.18 could not be determined and can be ascertained with the larger sample size. Our findings highlight the importance of assessing frailty preoperatively and considering anesthesia technique for high-frailty patients to minimize severe postoperative complications and improve outcomes. While trends are evident, further research with larger sample sizes may be necessary to fully understand the implications of these preferences for anesthesia selection in different frailty categories.

In our study, the incidence of readmission (41.5%), rises sharply as the mFI increases to ≥ 0.27 (p<0.001). While no deaths were reported in any mFI score groups in our study, the findings underscore the importance of frailty assessment in predicting postoperative

outcomes. A study conducted by **Wahl et al and Pitts et al** have found that the mFI was associated with readmission (odds ratio [OR], 1.11; 95% CI, 1.10-1.12) and the modified frailty index score significantly increased the odds of mortality (odds ratio = 1.475, P =.012), readmission (odds ratio = 1.472, P =.004), duration of stay (relative risk = 1.136, P =.001. [17, 20]

Our study also highlights a substantial correlation between higher mFI scores and prolonged hospitalizations, with patients scoring ≥0.27 experiencing significantly longer hospital stays (8.0±2.59). Similar results have been obtained in the study by **Louwers et al** which revealed significant rise in Clavien 4 complications, mortality rates, and extended hospital stays as the mFI score increases to 0.33. However, the strong link between frailty and complications emphasizes the need for thorough preoperative frailty assessments to identify at-risk patients and implement individualized care plans to mitigate postoperative complications effectively.[10]

In one of the largest studies to date, **Velanovich et al**. reviewed greater than 900,000 ACS-NSQIP surgeries in a wide variety of surgical subspecialties including cardiac, gynecologic, neurosurgical and others. They found a stepwise increase of both mortality (ORs range from 1.33 to 46.33) and morbidity (ORs range from 1.24 to 3.36) for each unit increase in mFI for each specialty and each level of operation complexity.[8] Our results add further support to the understanding that increased frailty, as measured by the mFI, is significantly associated with developing Clavien Dindo grade IV complications.

Our study had several important implications. First, the variables utilized to calculate the mFI are physical, readily available from the history, and easily reproducible. The

identification of frailty enables an objective evaluation of the potential for the development of complications and recovery from them. This can in turn help in better informing the collective decision-making process, which is crucial for preoperative counselling and patient selection.

Second, frailty, instead of being an irreversible state, occurs as a continuum within a spectrum, with the possibility of transitions between higher and lower states of frailty. [32] Therefore, identification of frail patients and implementation of prehabilitation strategies to treat modifiable factors that determine frailty may prevent further deterioration in physical and functional impairment and potentially improve postoperative outcomes.[33,34,35]

These remedies include measures like referring patients to specialized geriatrics clinics for an in-depth evaluation and including physical and cognitive activity, social support, and nutrition for individuals in the early stages of frailty. Although several individual variables within the mFI are likely not modifiable during the preoperative period, a multidisciplinary team approach can help to mitigate the risks associated with specific preoperative risk factors.

In addition, stratifying risks and preventing complications may be achieved with preoperative mFI assessment. Patients with greater mFI levels required more care, such as strict monitoring and timely intervention strategies. Also, preoperative aggressive controls of some comorbidities (positive mFI items) may be beneficial.

# CONCLUSION

Gender and anesthesia type generally did not significantly affect complication rates, except in higher mFI grades. Older patients and those undergoing major surgeries faced increased complications. Higher mFI scores consistently predicted more severe postoperative complications, particularly in CD grades II and IV/ICU, highlighting mFI's predictive value. High-frailty patients experienced more respiratory and cardiovascular impairments. Neuraxial anesthesia correlated with fewer minor complications, while general anesthesia led to greater incidence of major postoperative complications. Differences in complication rates between anesthesia techniques varied but lacked consistency. Higher mFI leads to increased incidence of 30 days readmission, especially in higher mFI groups. Higher mFI scores resulted in longer hospital stays, though no deaths were reported. Frailty assessment is crucial for predicting postoperative outcomes.

# STRENGTH AND LIMITATIONS OF THE STUDY

*Strength:* The main strength of our study is that this prospective study fills a critical gap in the existing literature. Prior research has primarily relied on retrospective data, lacking the advantages of real-time data collection and analysis. To our knowledge, no studies have investigated the association between frailty and anesthesia technique in predicting postoperative complications. By examining this aspect, we contribute valuable insights that can aid in optimizing anesthesia selection for patients with varying levels of frailty, ultimately enhancing surgical outcomes and patient care.

*Limitations:* First, this was a single-center study. A larger multi-center trial is needed to confirm our findings and to fully understand the implications of anesthesia selection in different frailty categories. The conclusion must also be validated using data from other centers. Second, our sample size was relatively small; thus, a larger cohort may be able to represent stronger association between different variables. Since we did not have any mortality in our cohort during the follow-up period of our study, we could not assess any correlation between mortality and mFI scores. This drawback can again be due to smaller sample size of our cohort. Importantly, only 32.8% of the patients in our study had a high mFI (mFI ≥0.27), which likely represents a selection bias toward healthier or less frail patients. The high-mFI group had significant morbidity (75.6%). Randomization of the participants with exact numbers of patients within each age group would have avoided the selection bias in our cohort.

# SUMMARY

This prospective observational cohort study investigated various factors influencing postoperative outcomes in 125 patients undergoing non-malignant abdominal surgery. In this study, we aim to investigate the correlation of mFI scores against prediction of postoperative complication graded as per Clavin-Dindo classification and type of anesthesia administered.

The Modified Frailty Index (mFI) played a significant role in predicting postoperative complications, with increasing mFI scores associated with a higher risk of both minor and major complications. Patients with mFI ≥0.27 had the highest risk of complications, including those requiring intensive care. Anesthesia type, either neuraxial or general, doesn't consistently impact complications in patients with mFI <0.27, but for patients with mFI ≥0.27, Neuraxial anesthesia appears to be associated with fewer CD grade II complications and significantly lower CD grade IV/ICU complications.High-frailty patients (mFI ≥0.27) are at a substantially higher risk of severe postoperative complications, irrespective of anesthesia type. Individual patient factors beyond anesthesia type, such as frailty (as measured by mFI), play a more significant role in determining postoperative outcomes.

Frailty, as measured by the mFI, strongly predicted 30-day readmission rates, with high-frailty patients having a significantly higher likelihood of readmission. Additionally, frailty was correlated with longer hospital stays, indicating its impact on resource allocation. Overall, frailty, as assessed by the mFI, emerged as a strong predictor of postoperative outcomes, including complications, readmission, and hospital length of stay. Age, type of surgery, and anesthesia type also played important roles, particularly in high-frailty patients.

Since there were no mortality in the cohort during the follow-up period of our study, no conclusion can be drawn regarding the effect of mFI scores on mortality.

These findings emphasize the need for comprehensive preoperative frailty assessments to modify surgical care and enhance patient outcomes. Further research with larger sample sizes can provide deeper insights into the nuances of anesthesia selection in different frailty categories.

# BIBLIOGRAPHY

1. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J et al; Cardiovascular Health Study Collaborative Research Group. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci. 2001 Mar;56(3):M146-56. doi: 10.1093/gerona/56.3.m146.

2. Makary MA, Segev DL, Pronovost PJ, Syin D, Bandeen-Roche K, Patel P et al. Frailty as a predictor of surgical outcomes in older patients. *J Am Coll Surg*. 2010;210(6):901-908. doi:10.1016/j.jamcollsurg.2010.01.028

3. Revenig LM, Canter DJ, Henderson MA, Ogan K, Kooby DA, Maithel SK, et al. Preoperative quantification of perceptions of surgical frailty. *J Surg Res*. 2015;193(2):583-589. doi:10.1016/j.jss.2014.07.069

4. Handforth C, Clegg A, Young C, Simpkins S, Seymour MT, Selby PJ, et al. The prevalence and outcomes of frailty in older cancer patients: a systematic review. *Ann Oncol*. 2015;26(6):1091-1101. doi:10.1093/annonc/mdu540

5. Murthy S, Hepner DL, Cooper Z, Bader AM, Neuman MD. Controversies in anaesthesia for noncardiac surgery in older adults. *Br J Anaesth*. 2015;115 Suppl 2(Suppl 2):ii15-ii25. doi:10.1093/bja/aev396

6. Oliver D, Griffiths R, Roche J, Sahota O. Hip fracture. *BMJ Clin Evid*.

2010;2010:1110. Published 2010 May 28.

7. Subramaniam S, Aalberg JJ, Soriano RP, Divino CM. New 5-Factor Modified Frailty Index Using American College of Surgeons NSQIP Data. *J Am Coll Surg*. 2018;226(2):173-181.e8. doi:10.1016/j.jamcollsurg.2017.11.005

8. Velanovich V, Antoine H, Swartz A, Peters D, Rubinfeld I. Accumulating deficits model of frailty and postoperative mortality and morbidity: its application to a national database. *J Surg Res*. 2013;183(1):104-110. doi:10.1016/j.jss.2013.01.021

9. Karam J, Tsiouris A, Shepard A, Velanovich V, Rubinfeld I. Simplified frailty index to predict adverse outcomes and mortality in vascular surgery patients. *Ann Vasc Surg*. 2013;27(7):904-908. doi:10.1016/j.avsg.2012.09.015

10. Louwers L, Schnickel G, Rubinfeld I. Use of a simplified frailty index to predict Clavien 4 complications and mortality after hepatectomy: analysis of the National Surgical Quality Improvement Project database. *Am J Surg*. 2016;211(6):1071-1076. doi:10.1016/j.amjsurg.2015.09.015

11. Obeid NM, Azuh O, Reddy S, Webb S, Reickert C, Velanovich V, et al. Predictors of critical care-related complications in colectomy patients using the National Surgical Quality Improvement Program: exploring frailty and aggressive laparoscopic approaches. *J Trauma Acute Care Surg*. 2012;72(4):878-883. doi:10.1097/TA.0b013e31824d0f70

12. Chappidi MR, Kates M, Patel HD, Tosoian JJ, Kaye DR, Sopko NA, et al. Frailty as a marker of adverse outcomes in patients with bladder cancer undergoing radical cystectomy. *Urol Oncol*. 2016;34(6):256.e1-256.e2566. doi:10.1016/j.urolonc.2015.12.010

13. Uppal S, Igwe E, Rice LW, Spencer RJ, Rose SL. Frailty index predicts severe complications in gynecologic oncology patients. *Gynecol Oncol*. 2015;137(1):98-101. doi:10.1016/j.ygyno.2015.01.532

14. Tsiouris A, Hammoud ZT, Velanovich V, Hodari A, Borgi J, Rubinfeld I. A modified frailty index to assess morbidity and mortality after lobectomy. *J Surg Res*. 2013;183(1):40-46. doi:10.1016/j.jss.2012.11.059

15. Ali R, Schwalb JM, Nerenz DR, Antoine HJ, Rubinfeld I. Use of the modified frailty index to predict 30-day morbidity and mortality from spine surgery. *J Neurosurg Spine*. 2016;25(4):537-541. doi:10.3171/2015.10.SPINE14582

16. Eslami MH, Saadeddin Z, Rybin DV, Doros G, Siracuse JJ, Farber A. Association of frailty index with perioperative mortality and in-hospital morbidity after elective lower extremity bypass. *J Vasc Surg*. 2019;69(3):863-874.e1. doi:10.1016/j.jvs.2018.07.050

17. Wahl TS, Graham LA, Hawn MT, Richman J, Hollis RH, Jones CE, et al. Association of the Modified Frailty Index With 30-Day Surgical Readmission. *JAMA Surg*.

2017;152(8):749-757. doi:10.1001/jamasurg.2017.1025

18. Mogal H, Vermilion SA, Dodson R, Hsu FC, Howerton R, Shen P, et al. Modified Frailty Index Predicts Morbidity and Mortality After Pancreaticoduodenectomy. *Ann Surg Oncol*. 2017;24(6):1714-1721. doi:10.1245/s10434-016-5715-0

19. Tatar C, Benlice C, Delaney CP, Holubar SD, Liska D, Steele SR, et al. Modified frailty index predicts high-risk patients for readmission after colorectal surgery for cancer. *Am J Surg*. 2020;220(1):187-190. doi:10.1016/j.amjsurg.2019.11.016

20. Pitts KD, Arteaga AA, Stevens BP, White WC, Su D, Spankovich C et al. Frailty as a Predictor of Postoperative Outcomes among Patients with Head and Neck Cancer. *Otolaryngol Head Neck Surg*. 2019;160(4):664-671. doi:10.1177/0194599818825466

21. Chen Y, Qin J. Modified Frailty Index Independently Predicts Postoperative Delirium and Delayed Neurocognitive Recovery After Elective Total Joint Arthroplasty. *J Arthroplasty*. 2021;36(2):449-453. doi:10.1016/j.arth.2020.07.074

22. Voskamp MJH, Vermeer M, Molijn GJ, Cornel EB. The Usefulness of the Modified Frailty Index for Muscle-Invasive Bladder Cancer Patients Treated with Radical Cystectomy [published correction appears in Curr Urol. 2021 Dec;15(4):253]. *Curr Urol*. 2020;14(1):32-37. doi:10.1159/000499263

23. Zorbas KA, Velanovich V, Esnaola NF, Karachristos A. Modified frailty index predicts complications and death after non-bariatric gastrectomies. *Transl Gastroenterol Hepatol*. 2021;6:10. Published 2021 Jan 5. doi:10.21037/tgh.2020.01.07

24. Rockwood K, Mitnitski A. Frailty defined by deficit accumulation and geriatric medicine defined by frailty. *Clin Geriatr Med*. 2011;27(1):17-26. doi:10.1016/j.cger.2010.08.008

25. Wagner D, DeMarco MM, Amini N, Buttner S, Segev D, Gani F et al. Role of frailty and sarcopenia in predicting outcomes among patients undergoing gastrointestinal surgery. *World J Gastrointest Surg*. 2016;8(1):27-40. doi:10.4240/wjgs.v8.i1.27

26. Audisio, R.A., van Leeuwen, B.L. Beyond "Age": Frailty Assessment Strategies Improve Care of Older Patients with Cancer. *Ann Surg Oncol* **22**, 3774–3775 (2015). https://doi.org/10.1245/s10434-015-4772-0

27. Cesari M, Gambassi G, van Kan GA, Vellas B. The frailty phenotype and the frailty index: different instruments for different purposes. *Age Ageing*. 2014;43(1):10-12. doi:10.1093/ageing/aft160

28. Rockwood K, Song X, MacKnight C, BergmanH, HoganDB, McDowellI, et al. A global clinical measure of fitness and frailty in elderly people. *CMAJ*. 2005;173(5):489-495. doi:10.1503/cmaj.050051

29. Clegg A, Young J, Iliffe S, Rikkert MO, Rockwood K. Frailty in elderly people [published correction appears in Lancet. 2013 Oct 19;382(9901):1328]. *Lancet*. 2013;381(9868):752-762. doi:10.1016/S0140-6736(12)62167-9

30. Adams P, Ghanem T, Stachler R, Hall F, Velanovich V, Rubinfeld I. Frailty as a predictor of morbidity and mortality in inpatient head and neck surgery. *JAMA Otolaryngol Head Neck Surg*. 2013;139(8):783-789. doi:10.1001/jamaoto.2013.3969

31. Farhat JS, Velanovich V, Falvo AJ, Horst HM, Swartz A, Patton Jr JH et al. Are the frail destined to fail? Frailty index as predictor of surgical morbidity and mortality in the elderly. *J Trauma Acute Care Surg*. 2012;72(6):1526-1531. doi:10.1097/TA.0b013e3182542fab

32. Gill TM, Gahbauer EA, Allore HG, Han L. Transitions between frailty states among community-living older persons. *Arch Intern Med*. 2006;166(4):418-423. doi:10.1001/archinte.166.4.418

33. McCorkle R, Strumpf NE, Nuamah IF, Adler DC, Cooley ME, Jepson C et al. A specialized home care intervention improves survival among older post-surgical cancer patients. *J Am Geriatr Soc*. 2000;48(12):1707-1713. doi:10.1111/j.1532-5415.2000.tb03886.x

34. Fiatarone MA, O'Neill EF, Ryan ND, Clements KM, Solares GR, Nelson ME et al. Exercise training and nutritional supplementation for physical frailty in very elderly

people. *N Engl J Med*. 1994;330(25):1769-1775. doi:10.1056/NEJM199406233302501

35. Morley JE, Vellas B, van Kan GA, Anker SD, Bauer JM, Bernabei R et al. Frailty consensus: a call to action. *J Am Med Dir Assoc*. 2013;14(6):392-397. doi:10.1016/j.jamda.2013.03.022

**Patient Proforma sheet**

**Demographic Data**

| | |
|---|---|
| Date/<br>Telephone no. | |
| UHID | |
| Name | |
| Age | |
| Sex | |
| Diagnosis | |
| Surgery | |
| Anesthesia<br>technique | |

**Calculation of mFI**

| Variables | NSQIP categories | Yes=1, No=0 |
|---|---|---|
| Functional and<br>Cognitive impairment | Preoperative functional health status | |
| | Impaired sensorium | |
| Comorbidities | Diabetes mellitus | |
| | H/o COPD, Current pneumonia | |
| | H/o CHF ≤ 30 days before surgery | |

| | | |
|---|---|---|
| | Previous PTCA/ Cardiac surgery | |
| | H/o angina ≤ 1 month before surgery | |
| | Hypertension requiring medication | |
| | H/o Transient ischemic attack | |
| | Cerebrovascular accident/ stroke with neurological deficit | |
| | H/o revascularization or amputation for peripheral vascular disease | |
| Total Score | | |
| mFI (Total/11) | | |

**Postoperative complications**

| **Minor Complications (CD grade 1 &2)** | | **Yes/no** |
|---|---|---|
| Postoperative Nausea/Vomiting<br>Mild Respiratory impairment<br>Mild Renal impairment<br>Mild Cardiovascular impairment<br>Mild Hepatic impairment | Managed without pharmacological intervention | |

| | | |
|---|---|---|
| Minor bleeding, mild anemia<br>SSI: mild | | |
| Postoperative Nausea/Vomiting moderate<br>Respiratory impairment<br>Moderate Renal impairment<br>Moderate Cardiovascular impairment<br>Moderate Hepatic impairment<br>Moderate to severe anemia<br>SSI requiring upgradation of antibiotics | Managed with pharmacological intervention | |
| Blood transfusion | | |
| Total parenteral nutrition | | |
| **Major complications (CD Grade 3 &4)** | | **Yes/no** |
| Complication requiring endoscopic/ radiological/ surgical intervention | | |

| | |
|---|---|
| ICU admission/management | |
| CNS complications | |
| Single organ dysfunction | |
| Multiorgan dysfunction | |

**Post-discharge Follow-up**

| **Variable** | |
|---|---|
| Length of hospital stay (days) | |
| Readmission within 30 days of surgery (Y/N) | |
| Death within 30 days of surgery (Y/N) | |

## PARTICIPANT INFORMATION SHEET

Dear.....

We are conducting a prospective observational study at the All India Institute of Medical Sciences to determine the association of frailty with the postoperative outcomes in patients undergoing non-malignant abdominal surgeries..

Patient/guardian is invited to take part in the study. You are requested to go through the following paragraphs:

i) **Title:** Association of frailty with Postoperative outcomes in patients undergoing elective non-malignant abdominal surgeries under general or neuraxial anaesthesia: A prospective observational cohort study.

ii) **Purpose of the Study:** To determine any association of frailty using modified frailty index with the postoperative outcomes in patients undergoing non-malignant abdominal surgeries.

iii) **Methodology:** This will be an observational study and is conducted as quality improvement initiative in the hospital. If you agree to participate in this study and if you fulfil the including criteria, you will be given a consent form to sign before proceeding further. The procedure will be thoroughly explained by an anesthesiologistconducting the study, a day before surgery and you can ask any query regarding the procedure. You will

be given a consent form to sign before proceeding further. All included patients will undergo preoperative evaluation and modified frailty index score will be calculated for each patients. Patients will receive anaesthesia as per standard protocol taking into consideration the preoperative status as well as site and duration of the surgery. Patients will be followed up for any postoperative complications until 48 hours after surgery. Further the patients will be followed up telephonically for the duration of 30 days ( twice in 15 days interval) after hospital discharge, to enquire about readmission due to any complication or mortality.

iv) **Eligibility to participate in the study:** All patients aged above 18 years , planned for elective non-malignant abdominal surgeries are eligible for participation in this study.

v) **Any risk to the subject associated with the study:** This will be an observational study. No new drug/device will be used on the participants in our study.

vi) **Confidentiality:** All the records will be confidential and the patient identity would be known to the chief investigator and would not be released to anybody else.

vii) **Provision of free treatment for research related injury:** No research related injury is expected. If any complication does occur, you will be provided treatment as per standard care, available at AIIMS, Bhopal.

**viii) Compensation of subjects for disability or death resulting from such injury:**

No disability or death is expected from the study.

ix) **Freedom of individual to participate and to withdraw from research at any time without penalty or loss of benefits to which the subject would otherwise entitled:** Participation in the study is voluntary. Refusal to participate will not influence care of the participants in this hospital in any way.

x) **Costs and Source of investigations and drugs**: You will not be charged anything for anything else related to this study project.

xi) **Available information sources:** The study is awaiting approval by the Ethical review board AIIMS, Bhopal. In case of any concerns or questions about the study, please contact the study investigator: Dr. Rinu Raju, 9846183379.

Email: rinukanatt@gmail.com

**Contact details of the ethics committee:**

Dr.Shashank Purwar

Member secretary,

IHEC,

AIIMS, Bhopal

Email: ihec@aiimsbhopal.edu.in

Contact no. 07773010099

## प्रतिभागी सूचना पत्र

**प्रिय.....** ...

हम सामान्य या न्यूरैक्सियल एनेस्थीसिया के तहत वैकल्पिक गैर कैंसर पेट की सर्जरी के रोगियों में पोस्ट ऑपरेटिव परिणामों के साथ कमजोरी का संबंध: एक संभावित अवलोकन कोहोर्ट अध्यय कर रहे हैं।

रोगी/अभिभावक को अध्ययन में भाग लेने के लिए आमंत्रित किया जाता है। आपसे निम्नलिखित पैराग्राफों को पढ़ने का अनुरोध किया जाता है:

i) **शीर्षक:** सामान्य या न्यूरैक्सियल एनेस्थीसिया के तहत वैकल्पिक गैर कैंसर पेट की सर्जरी के रोगियों में पोस्ट ऑपरेटिव परिणामों के साथ कमजोरी का संबंध: एक संभावित अवलोकन कोहोर्ट अध्यय

ii) **अध्ययन का उद्देश्य:** गैर- कैंसर पेट की सर्जरी के दौर से गुजर रहे रोगियों में पोस्टऑपरेटिव परिणामों के साथ संशोधित कमजोर सूचकांक का उपयोग करके किसी भी तरह की कमजोरी का निर्धारण करना।

iii) **कार्यप्रणाली:** यह एक अवलोकन अध्ययन होगा और अस्पताल में गुणवत्ता सुधार पहल के रूप में आयोजित किया जाता है। यदि आप इस अध्ययन में भाग लेने के लिए सहमत हैं और यदि आप शामिल मानदंडों को पूरा करते हैं, तो आगे बढ़ने से पहले आपको हस्ताक्षर करने के लिए एक सहमति फॉर्म दिया जाएगा। सर्जरी से एक दिन पहले अध्ययन करने वाले एनेस्थेसियोलॉजिस्ट द्वारा प्रक्रिया को पूरी तरह से समझाया जाएगा और आप प्रक्रिया के बारे में कोई भी प्रश्न पूछ सकते हैं। आगे बढ़ने से पहले आपको हस्ताक्षर करने के लिए एक सहमति फॉर्म दिया जाएगा। सभी शामिल रोगियों का प्रीऑपरेटिव मूल्यांकन किया जाएगा और प्रत्येक रोगी के लिए संशोधित कमजोर सूचकांक स्कोर की गणना की जाएगी। मरीजों को सर्जरी से पहले की स्थिति के साथ-साथ साइट और सर्जरी की अवधि को ध्यान में रखते हुए मानक प्रोटोकॉल के अनुसार एनेस्थीसिया दिया जाएगा। सर्जरी के 48 घंटे बाद तक किसी भी पोस्टऑपरेटिव जटिलताओं के लिए मरीजों का पालन किया जाएगा। इसके अलावा, अस्पताल से छुट्टी मिलने के बाद 30 दिनों (15 दिनों के अंतराल में दो बार) की अवधि के लिए रोगियों का टेलीफोन पर पालन किया जाएगा, ताकि किसी भी जटिलता या मृत्यु के कारण फिर से भर्ती होने के बारे में पूछताछ की जा सके।

iv) **अध्ययन में भाग लेने की पात्रता:** 18 वर्ष से अधिक आयु के सभी रोगी, जो वैकल्पिक गैर-घातक पेट की सर्जरी के लिए नियोजित हैं, इस अध्ययन में भाग लेने के लिए पात्र हैं।

v) **अध्ययन से जुड़े विषय के लिए कोई जोखिम**: यह एक अवलोकन अध्ययन होगा। हमारे अध्ययन में भाग लेने वालों पर किसी नई दवा/उपकरण का प्रयोग नहीं किया जाएगा।

vi) **गोपनीयता:** सभी रिकॉर्ड गोपनीय होंगे और रोगी की पहचान मुख्य अन्वेषक को ज्ञात होगी और किसी और को जारी नहीं की जाएगी।

vii) **अनुसंधान संबंधी चोट के लिए नि:शुल्क उपचार का प्रावधान:** अनुसंधान संबंधी किसी चोट की संभावना नहीं है। यदि कोई जटिलता होती है, तो आपको एम्स, भोपाल में उपलब्ध मानक देखभाल के अनुसार उपचार प्रदान किया जाएगा।

viii) **इस तरह की चोट के परिणामस्वरूप विकलांगता या मृत्यु के लिए विषयों का मुआवजा:** अध्ययन से कोई विकलांगता या मृत्यु की उम्मीद नहीं है।

ix) **व्यक्ति को किसी भी समय दंड या लाभों के नुकसान के बिना भाग लेने और अनुसंधान से हटने की स्वतंत्रता:** अध्ययन में भाग लेना स्वैच्छिक है। भाग लेने से इंकार करने से इस अस्पताल में प्रतिभागियों की देखभाल किसी भी तरह से प्रभावित नहीं होगी।

x) **जांच और दवाओं की लागत और स्रोत:** इस अध्ययन परियोजना से संबंधित किसी अन्य चीज के लिए आपसे कोई शुल्क नहीं लिया जाएगा।

xi) **उपलब्ध सूचना स्रोत:** अध्ययन को एथिकल रिव्यू बोर्ड एम्स, भोपाल द्वारा अनुमोदन की प्रतीक्षा है। अध्ययन के बारे में किसी भी चिंता या प्रश्न के मामले में, कृपया अध्ययन अन्वेषक से संपर्क करें: डॉ. रिनू राजू, 9846183379, ई-मेल: rinukanatt@gmail.com

**आचार समिति के संपर्क विवरण**

डॉ. शशांक पुरवार
सदस्य सचिव,
IHEC,
एम्स भोपाल।
ई-मेल: ihec@aiimsbhopal.edu.in
संपर्क नंबर- 07773010099

**INFORMED CONSENT FORM**

Title: Association of frailty with Postoperative outcomes in patients undergoing elective non-malignant abdominal surgeries under general or neuraxial anaesthesia: A prospective observational cohort study.

You have been asked to participate in a research study. You have been informed about the study by Dr. Rinu Raju.

You can contact anytime if you have any queries regarding the research study.

| | Yes/No |
|---|---|
| 1.I confirm that I have read and understood the information sheet for the study. I confirm that the study has been explained to me andI have had ample time and opportunity to ask questions. | ( ) |
| 2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected | ( ) |
| 3. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s) | ( ) |

I confirm that I have fully explained all aspects of the trial to the subject (or legally acceptable Representative)

Signature of the person conducting the Informed Consent;

____/___/_____

| | | |
|---|---|---|
| Name of the Study Investigator<br>Dr. Rinu Raju | Signature of the Study Investigator | Date/Month/Year |

| | | |
|---|---|---|
| Name of the Participant | Signature of the participant | Date/month/year |

# सूचित सहमति -पत्र

**शीर्षक- "सामान्य या न्यूरैक्सियल एनेस्थीसिया के तहत वैकल्पिक गैर कैंसर पेट की सर्जरी के रोगियों में पोस्ट ऑपरेटिव परिणामों के साथ कमजोरी का संबंध: एक संभावित अवलोकन कोहोर्ट अध्ययन"।**

आपको एक शोध अध्ययन में भाग लेने के लिए कहा गया है।
आपको डॉ. रिनू राजू द्वारा अध्ययन के बारे में सूचित किया गया है, यदि आप अनुसंधान अध्ययन के बारे में कोई प्रश्न पूछना चाहते हैं, तो आप कभी भी संपर्क कर सकते हैं।

| | हाँ / नही |
|---|---|
| 1. मैं पुष्टि करता हूं कि मैंने अध्ययन के लिए सूचना पत्र पढ़ा और समझा है। मैं पुष्टि करता हूं कि अध्ययन ने मुझे समझाया है और मेरे पास सवाल पूछने के लिए पर्याप्त समय और अवसर है। | [ ] |
| 2. मैं समझता हूं कि अध्ययन में मेरी भागीदारी स्वैच्छिक है और मैं बिना किसी कारण के, बिना किसी चिकित्सीय देखभाल या कानूनी अधिकारों के प्रभावित हुए, किसी भी समय वापस लेने के लिए स्वतंत्र हूं। | [ ] |
| 3. मैं इस अध्ययन से उत्पन्न किसी भी डेटा या परिणामों के उपयोग को प्रतिबंधित नहीं करने के लिए सहमत हूं, बशर्ते ऐसा उपयोग केवल वैज्ञानिक उद्देश्य के लिए हो | [ ] |

मैं पुष्टि करता हूं कि मैंने परीक्षण के सभी पहलुओं (या कानूनी रूप से स्वीकार्य प्रतिनिधि) को पूरी तरह से समझाया है जो सूचित सहमति का संचालन करने वाले व्यक्ति का हस्ताक्षर है;

_____ _____ ____ / __ / _____
नाम अध्ययनअन्वेषक अध्ययन अन्वेषक के हस्ताक्षर तिथि /महीना/ वर्ष

डॉ. रिनू राजू

_____ _____ ____ / __ / _____
विषय का नाम व्यक्ति का हस्ताक्षर तिथि /महीना/ वर्ष

| Sl No | UHID | Age | Sex | Diagnosis | Surgery | TYPE OF SURGERY | Anesthesia technique | Functional impairment | Impaired sensorium | diabetes mellitus | COPD or pneumonia | H/O CHF/PTCA/Cardiac surgery | H/O MI | HTN requiring medication | TIA | CVA/STOKE with neurological deficit | H/o PVD/ rest pain | total score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.3921E+14 | 18 | male | TRANSFUSION DEPENDENT THALASSEMIA MAJOR | SPLENECTOMY | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2 | 2.3921E+14 | 20 | male | RIGHT INGUINAL HERNIA wwith hydrocele | lichenstein mesh hemioplasty with jaboulai's procedu | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 2.3921E+14 | 22 | male | RECTAL PROLAPSE | LAP VENTRAL MESH RECTOPEXY | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 2.3921E+14 | 22 | Female | hydatid cyst liver | Lap deroofing | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 2.3921E+14 | 23 | male | right renal calculus | right PCNL + DJ stenting | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 2.3921E+14 | 23 | male | O/c/o exploratory laparotomy for blunt trauma abdomen with splenectomy , cc | Explor laparotomy with stoma closure with abd wall r | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7 | 2.3921E+14 | 24 | male | Right indirect inguinal hernia | open inguinal hemioplasty | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 2.3921E+14 | 24 | Female | primary subfertility | DHL | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 2.3921E+14 | 29 | Female | primary subfertility | diagnostic hysterolaparoscopy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 2.3921E+14 | 29 | Female | right haemorrhagic ovarian cyst | **open oopherectomy** | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 | 2.3921E+14 | 29 | Female | CHOLITHIASIS | lap cholecystectomy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 12 | 2.3921E+14 | 29 | Male | Achalasia cardia | Lap hellers myotomy with fundoplication | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13 | 2.3921E+14 | 30 | Female | MUCOCELE OF GB | lap cholecystectomy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 2.3921E+14 | 30 | Female | cholelithiasis | lap partial cholecystectomy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 15 | 2.3921E+14 | 31 | Female | LEFT TUBO OVARIAN COMPLEX PYOSALPINX | diagnostic laparoscopy | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 16 | 2.3921E+14 | 32 | male | ACUTE APPENDICITIS | LAP APPENDICECTOMY | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 2.3921E+14 | 33 | Female | B/L ENDOMETRIOMA WITH PREV EXPLORATORY LAPAROTOMY WITH HYPOTHYR | EXP LAPAROTOMY F/B ADHESIOLYSIS WITH B/L SALPIN | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 18 | 2.3921E+14 | 33 | Female | AUB -L | **TAH+BSO** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 2.3921E+14 | 34 | Female | HYDATID CYST LIVER | **OPEN HYDATID DEROOFING AND DECOMPRESSION** | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 20 | 2.3921E+14 | 35 | male | left nonfunctioning kidney | open left simple nephrectomy | 3 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 21 | 2.3921E+14 | 35 | Female | Choledochal cyst, cystohepatolithiasis, liver atrophy, hypertrophy complex, spl | Expl laparotomy choledochal cyst excision , hepatoje | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 22 | 2.3921E+14 | 36 | Female | AUB-A | **TAH+BSO** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 2.3921E+14 | 36 | male | S/P ILEOSTOMY | **STOMA REVERSAL** | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 24 | 2.3922E+14 | 36 | Female | Malrotation of gut with abdominal koch , ileal stricture | Diagnostic lap ladd's procedure | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 25 | 2.3921E+14 | 37 | Female | Resolved gallstone induced pancreatitis | lap cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 26 | 2.3921E+14 | 38 | Female | fibroid uterus | **TAH+BSO** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | 2.3921E+14 | 38 | Female | Extra hepatic portal venous obstruction with portal hon, HYPERSPLENISM, CLD | **SPLENECTOMYWITH splenorenal shunt** | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 |
| 28 | 2.3921E+14 | 40 | male | LEFT INDIRECT inguinal hernia | left open mesh hemioplasty | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | 2.3921E+14 | 40 | male | F/U/C/O ILEOSTOMY | **STOMA REVERSAL** | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 30 | 2.3921E+14 | 40 | Male | Gastric outlet obstruction | **Truncal vagotomy** | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 31 | 2.3921E+14 | 40 | Female | complete rectal prolapse | Lap rectopexy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 32 | 2.3921E+14 | 40 | male | corrosive injury with refractory UGI bleed | expl laparotomy, intraop endoscopy, gastrectomy | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 33 | 2.3921E+14 | 40 | Female | Corrosive injury stomach with goo | EXPLO LAPAROTOMY, GASTROJEJUNOSTOMY WITH TO | 3 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 34 | 2.3921E+14 | 40 | Female | Complicated colonic diverticular disease with jejunocolic fistula | expl laparotomy , sigmoid resection, fistula repair | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 35 | 2.3921E+14 | 40 | MALE | Right staghorn calculi, left renal and ureteric calculi | Left URSL +pcnl | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 36 | 2.3921E+14 | 41 | Female | subserosal fibroid | **TAH+BSO** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 37 | 2.3921E+14 | 42 | Female | Choledocholithiasis | **open CBD exploration with cholecystectomy** | 3 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 38 | 2.3921E+14 | 42 | male | left PUJ calculus | left PCNL+ left DJ stenting | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 39 | 2.3921E+14 | 42 | Female | AUB-A | LAVH | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 40 | 2.3921E+14 | 42 | Female | Koch's abdomen with ileocecal junction stricture with subacute intestinal obst | Right hemicolectomy | 3 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 41 | 2.3921E+14 | 42 | male | Ileostomy site suture dehiscence , with mucus fistula | **Stoma site resuturing** | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 42 | 2.3921E+14 | 44 | Female | AUB-A | **TAH+BSO** | 3 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 43 | 2.3921E+14 | 44 | Female | Mucocele appendix | **Lap hemicolectomy** | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 44 | 2.3914E+14 | 44 | male | Oesophageal stricture | **Feeding jejunostomy** | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 45 | 2.3921E+14 | 44 | female | Right poorly functioning kidney | **Right lap nephrectomy** | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46 | 2.3921E+14 | 45 | Female | AUB-A | **TAH+BSO** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 47 | 2.3921E+14 | 45 | male | Chronic calcific pancreatitis | **Pancreaticojejunostomy** | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 48 | 2.3921E+14 | 45 | male | Right inguinal hernia | Right inguinal hemioplasty | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 |
| 49 | 2.3921E+14 | 45 | female | epigastric hernia | open mesh hemioplasty | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 50 | 2.3921E+14 | 46 | male | GOO, D3 STRICTURE WITH SMA AND CELIAC TRUNK THROMBOSIS | **GASTROJEJUNOSTOMY** | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 51 | 2.3921E+14 | 47 | Male | epigastric hernia | lap intraperitoneal onlay mesh(IPOM )hemioplasty | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 52 | 2.3921E+14 | 47 | Female | incisional hernia | Hemioplasty | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 53 | 2.3921E+14 | 47 | Female | Cervical fibroid | **TAH+BSO** | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 54 | 2.3921E+14 | 48 | Female | fibroid uterus | **TAH+BSO** | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 55 | 2.3921E+14 | 49 | Female | AUB-L | **TAH+BSO** | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 56 | 2.3921E+14 | 49 | male | POST cholecystectomy BENIGN BILLIARY STRICTURE | **HEPATICOJEJUNOSTOMY** | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 57 | 2.3921E+14 | 49 | male | O/c/o rectovaginal fistula repair with adhesiolysis, colostomy insitu | **Colostomy closure** | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 58 | 2.3921E+14 | 50 | Female | Hydatid cyst liver with cholelithiasis | Lap renoofing with cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 59 | 2.3921E+14 | 50 | male | Double barrel stoma | **Stoma reversal** | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 60 | 2.3921E+14 | 51 | Female | AUB-L | TAH+BSO | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 61 | 2.3921E+14 | 52 | Female | SEALED Off perforation of GB | lap cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 62 | 2.3921E+14 | 52 | Female | SEALED Off perforation of GB | lap cholecystectomy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| 63 | 2.3921E+14 | 52 | male | F/U/C/O expl laparotomy for peritonitis with ileostomy | Stoma closure | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 64 | 2.3921E+14 | 52 | male | Gallstone disease | Open cholecystectomy | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 65 | 2.3921E+14 | 53 | male | F/U/C/O ENTERIC PERFORATION | STOMA REVERSAL | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 66 | 2.3921E+14 | 53 | male | F/U/C/O acute biliary pancreatitis with walled of necrosis | Lap internal drainage and cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 67 | 2.3921E+14 | 55 | male | right staghorn calculus with left NFK | right PCNL + DJ stenting | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 68 | 2.3921E+14 | 55 | Female | F/U/C/O Benign biliary stricture with mirrizzi syndrome , post cholecystectomy | expl laparotomy with hepaticojejunostomy | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 69 | 2.3921E+14 | 55 | MALE | choledocholithiasis | Open cholecystectomy with CBD exploration | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 70 | 2.3921E+14 | 56 | Female | right ovarian cyst | TAH+BSO | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 71 | 2.3922E+14 | 56 | Female | gallstone pancreatitis | lap cholecystectomy | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 72 | 2.3921E+14 | 56 | Female | gall stone pancreatitis | open cholecystectomy with CBD exploration | 3 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 73 | 2.3922E+14 | 56 | Female | UMBILICAL HERNIA | open mesh hemioplasty | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 74 | 2.3921E+14 | 56 | male | Peptic ulcer disease , gastric outlet obstruction | Truncal vagotomy, gastrojejunostomy | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 75 | 2.3921E+14 | 56 | male | Symptomatic cholelithiasis with liver cirrhosis | Open cholecystectomy | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |

| | MRI | ASA STATUS | minor complication | | | | | | | | | | | | | | | | major complication | | | | length of hospital stay | admission within 30days of surgery | death within 30days of surgery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CD grade 1 | | | | | | | | CD grade 2 | | | | | | | blood transfusion | TPN | CD GRADE3 | CD GRADE 4/ ICU admission | | | | |
| | | | mild POSTOP NV(CD grade1) | MINOR BLEEDING(HAEMATA(CD grade1) | mild SSI | mild resp impairm | mild renal impairm | mild cns impairmer | mild hepatic impai | MOD SSI(CD grade2) | POSTOP NV (CD grade2) | mod resp impairm | mod renal impairm | mod cns impairmer | mod hepatic impairment | | | | | | CD GRADE | | | |
| 4 | 0.09 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 10 | 1 | 0 |
| 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 8 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 9 | 0.09 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 |
| 10 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 12 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 13 | 0.09 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 0 |
| 14 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| 15 | 0.09 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 |
| 16 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 17 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 18 | 0.18 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 19 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 20 | 0.18 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 21 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 22 | 0.09 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 23 | 0.18 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 24 | 0.18 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 |
| 25 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 26 | 0.18 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 |
| 27 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 | 8 | 1 | 0 |
| 28 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 29 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 30 | 0.27 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 8 | 1 | 0 |
| 31 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 32 | 0.27 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 |
| 33 | 0.27 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 4 | 9 | 1 | 0 |
| 34 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 35 | 0.27 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 4 | 7 | 1 | 0 |
| 36 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 4 | 7 | 1 | 0 |
| 37 | 0.18 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 6 | 0 | 0 |
| 38 | 0.09 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 |
| 39 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |
| 40 | 0.18 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 0 |
| 41 | 0.27 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |
| 42 | 0.18 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |
| 43 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 4 | 8 | 1 | 0 |
| 44 | 0.27 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 | 0 |
| 45 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 | 7 | 0 | 0 |
| 46 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 8 | 0 | 0 |
| 47 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 0 |
| 48 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 49 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 50 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 4 | 8 | 1 | 0 |
| 51 | 0.27 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 |
| 52 | 0.27 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 6 | 1 | 0 |
| 53 | 0.36 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 4 | 9 | 0 | 0 |
| 54 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 55 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 56 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 7 | 0 | 0 |
| 57 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 58 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 0 |
| 59 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 60 | 0.27 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 61 | 0.27 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 0 | 0 |
| 62 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 63 | 0.09 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 |
| 64 | 0.27 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 10 | 1 | 0 |
| 65 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 66 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 |
| 67 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 68 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 1 | 0 |
| 69 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 | 7 | 0 | 0 |
| 70 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 71 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 72 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 |
| 73 | 0.09 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 |
| 74 | 0.27 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 | 0 |
| 75 | 0.18 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 |

| Sl No | UHID | Age | Sex | Diagnosis | Surgery | TYPE OF SURGERY | Anesthesia technique | Functional impairment | Impaired sensorium | diabetes mellitus | COPD or pneumonia | H/O CHF | TCA/Cardiac surgery | H/O MI | HTN requiring medication | TIA | VA/STOKE with neurological deficit | H/o PVD/ rest pain | total score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | 2.3921E+14 | 56 | female | Left non functioning kidney | Lap left simple nephrectomy | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 77 | 2.3921E+14 | 57 | Female | LEFT DIAPHRAGMATIC EVENTRATION | LAP LEFT DIAPHRAGMATIC PUCATION | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 78 | 2.3921E+14 | 58 | male | Ascending colon stricture post TB | Right hemicolectomy | 3 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 79 | 2.3921E+14 | 60 | MALE | umbilical hernia | Lap intraperitoneal onlay mesh repair | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | **2** |
| 80 | 2.3921E+14 | 60 | MALE | Choledochocolic fistula | Open cholecystectomy | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 81 | 2.3921E+14 | 60 | male | LEFT INDIRECT inguinal hernia | lap TAPP | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| 82 | 2.3921E+14 | 60 | male | Complex incisional hernia | open hernia repair | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **1** |
| 83 | 2.3921E+14 | 61 | Female | double bowel stoma fo distal ileal perforation | STOMA REVERSAL | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 84 | 2.3921E+14 | 61 | Female | incisional hernia | open mesh hemioplasty | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| 85 | 2.3921E+14 | 62 | male | recurrent incisional hernia | open mesh hemioplasty | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 86 | 2.3921E+14 | 63 | male | B/L direct inguinal hernia | b/l OPEN MESH HERNIOPLASTY | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| 87 | 2.3921E+14 | 63 | female | UTERINE FIBROID | TAHBSO | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 |
| 88 | 2.3921E+14 | 64 | Female | CHOLELITHIASIS | LAP CHOLECYSTECTOMY | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 89 | 2.3921E+14 | 64 | female | cholelithiasis | OPEN CHOLECYSTECTOMY | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| 90 | 2.3921E+14 | 64 | female | Achalasia cardia | hellies myotomy with fundoplication | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **3** |
| 91 | 2.3922E+14 | 64 | male | Postcholecystectomy benign billiary stricture | Roux en y hepaticojejunostomy | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **2** |
| 92 | 2.3921E+14 | 64 | Female | Giant simple hepatic cyst right lobe of liver | Lap deroofing | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 93 | 2.3921E+14 | 64 | male | right inguinal hernia | open inguinal hemioplasty | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 94 | 2.3921E+14 | 65 | male | Right pantaloon hernia | right open mesh hemioplasty | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 95 | 2.3921E+14 | 65 | Female | cholelithiasis | lap cholecystectomy | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 96 | 2.3921E+14 | 65 | male | UMBILICAL HERNIA | OPEN HENIOPLASTY | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 97 | 2.3921E+14 | 65 | Female | choledocholithiasis | open CBD exploration | 2 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 98 | 2.3921E+14 | 65 | male | C/C CALCULOUS CHOLECYSTITIS | lap cholecystectomy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 99 | 2.3922E+14 | 65 | Female | cholelithiasis with choledocholithiasis | cholecystectomy with CBD exploration, RYHJ | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **3** |
| 100 | 2.3921E+14 | 66 | male | Right direct inguinal hernia | open inguinal hemioplasty | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 101 | 2.3921E+14 | 66 | Female | symptomatic gallstone disease | lap cholecystectomy | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 2 |
| 102 | 2.3921E+14 | 67 | male | Right direct inguinal hernia | mesh hemioplasty | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 103 | 2.3921E+14 | 68 | male | RIGHT inguinal hernia | mesh hemioplasty | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 104 | 2.3921E+14 | 68 | Female | choledocholithiasis | CBD exploration | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 105 | 2.3922E+14 | 68 | male | LEFT INGUINAL HERNIA | LEFT LICHENSTEIN HERNIOPLASTY | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 106 | 2.3922E+14 | 68 | Female | cholecystitis | lap cholecystectomy | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 107 | 2.3922E+14 | 68 | male | LEFT INGUINAL HERNIA | open mesh hemioplasty | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 |
| 108 | 2.3921E+14 | 68 | male | Recurrent inguinal hernia with sinus | open inguinal hemioplasty | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **3** |
| 109 | 2.3921E+14 | 69 | male | incisional hernia | open hernia repair | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 4 |
| 110 | 2.3921E+14 | 70 | male | CHOLELITHIASIS WITH CBD stent insitu | Open cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| 111 | 2.3921E+14 | 70 | male | RIGHT FEMORAL HERNIA | mesh hemioplasty | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 112 | 2.3921E+14 | 70 | Female | CHOLELITHIASIS WITH LEFT INGUINAL HERNIA | OPEN CHOLECYSTECTOMY | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 5 |
| 113 | 2.3921E+14 | 70 | male | UMBILICAL HERNIA | open mesh hemioplasty | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 114 | 2.3921E+14 | 70 | Female | RIGHT FEMORAL HERNIA | femoral hernia repair | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 115 | 2.3921E+14 | 72 | male | symptomatic gallstone disease | lap cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 116 | 2.3921E+14 | 72 | female | b/l inguinal hernia | B/L MESH HERNIOPLASTY | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 4 |
| 117 | 2.3921E+14 | 73 | Female | STUMP CHOLECYSTITIS | OPEN TOTAL CHOLECYSTECTOMY | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 4 |
| 118 | 2.3921E+14 | 73 | Female | incisional hernia | open henia repair | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 119 | 2.3921E+14 | 73 | Female | stump cholecystitis | open complete cholecystectomy | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 120 | 2.3921E+14 | 74 | male | incisional hernia | Open mesh repair | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **3** |
| 121 | 2.3921E+14 | 75 | Female | 3rd degree UV descent | VWPFR | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 122 | 2.3921E+14 | 75 | male | b/l inguinal hernia | B/L TEP | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 123 | 2.3922E+14 | 76 | male | right inguinal hernia | open mesh hemioplasty | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 124 | 2.3921E+14 | 76 | female | Liver cyst | marsupilization | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| 125 | 2.3921E+14 | 80 | Female | EPIGASTRIC HERNIA | open mesh hemioplasty | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

| | MRI | ASA STATUS | minor complication | | | | | | | | | | | | | | | | major complication | | | | | length of hospital stay | admission within 30days of surgery | death within 30days of surgery | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CD grade 1 | | | | | | | | | CD grade 2 | | | | | | blood transfusion | TPN | CD GRADE3 | CD GRADE 4/ ICU admission | | | | | |
| | | | mild POSTOP NV(CD grade1) | MINOR BLEEDING(HAEMATOMA)(CD grade1) | mild SSI | mild resp impairment | mild renal impairment | mild cvs impairment | mild hepatic impairment | MOD SSI(CD grade2 | POSTOP NV (CD grade2) | mod resp impairment | mod renal impairment | mod cvs impairment | mod hepatic impairment | | | | | | | CD GRADE | | | | |
| 75 | 0.18 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | |
| 76 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 0 | 0 | | |
| 77 | 0.27 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 4 | 8 | 1 | 0 | | | |
| 78 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 79 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | | | |
| 80 | 0.27 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 15 | 0 | 0 | | | |
| 81 | 0.27 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 5 | 4 | 20 | 1 | 0 | | | |
| 82 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 83 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | | | |
| 84 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | | | |
| 85 | 0.09 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | | | |
| 86 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 87 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 88 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 8 | 0 | 0 | | | |
| 89 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 6 | 0 | 0 | | | |
| 90 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 8 | 0 | 0 | | | |
| 91 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | | | |
| 92 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 93 | 0.27 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 | 8 | 1 | 0 | | | |
| 94 | 0.18 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 7 | 0 | 0 | | | |
| 95 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | | | |
| 96 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | | | |
| 97 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | | | |
| 98 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 99 | 0.27 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 100 | 0.27 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 9 | 0 | 0 | | | |
| 101 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 102 | 0.27 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 4 | 8 | 0 | 0 | | | |
| 103 | 0.18 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 104 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | | | |
| 105 | 0.18 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | | | |
| 106 | 0.09 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 107 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 4 | 7 | 1 | 0 | | | |
| 108 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 109 | 0.18 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 110 | 0.18 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 111 | 0.27 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 7 | 0 | 0 | | | |
| 112 | 0.36 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 8 | 0 | 0 | | | |
| 113 | 0.18 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 114 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 0 | 0 | | | |
| 115 | 0.45 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 9 | 0 | 0 | | | |
| 116 | 0.18 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 117 | 0.18 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | | | |
| 118 | 0.27 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | | | |
| 119 | 0.36 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 9 | 0 | 0 | | | |
| 120 | 0.36 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 4 | 10 | 0 | 0 | | | |
| 121 | 0.27 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 122 | 0.18 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 0 | | | |
| 123 | 0.27 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 0 | 0 | | | |
| 124 | 0.18 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | | | |
| 125 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 0 | 0 | | | |
| 126 | 0.27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 8 | 0 | 0 | | | |
| 127 | 0.36 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 8 | 1 | 0 | | | |
| 128 | 0.27 | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 4 | 10 | 1 | 0 | | | |